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ABSTRACT

This guide is designed to aid the development of vocational education programs in agriculture in local school districts. Major program objectives, good learning conditions, program evaluation, suggested teaching methods, and Wisconsin's philosophy and procedures in developing occupational experience programs in vocational agriculture/agribusiness are discussed in the introduction. Sixty vocational agriculture programs are described, including the following: animal nutrition, beef production, conservation, dairy herd testing, forestry, gardening, hydraulics, poultry, soybeans, and arc welding. Each program contains the following elements: program objectives, concepts to develop, subject matter to teach, motivation, learning activities, and materials needed. A directory of publishers of vocational instructional materials is appended. (CT)

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WAVAI CURRICULUM GUIDE FOR INSTRUCTION IN WISCONSIN HIGH SCHOOLS

1975 Revision

by

Curriculum Study Committee

Wisconsin Association of Vocational Agricultural Instructors

U.S. DEPARTMENT OF HEALTH, EDUCATION & WELFARE
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FOREWORD

The curriculum in Vocational Agriculture/Agribusiness Occupations must be constantly adjusted to the changes that are taking place in the broad field of agriculture.

A course of study developed on the state level can only be suggestive insofar as any individual instructor's local program is concerned. This course of study *must* be adapted to fit the needs of the individual student and the community in which he resides.

This course of study was completed through the combined efforts of more than fifty agriculture instructors, the teacher training staffs, and the agriculture consultants on the state staffs. Part of the funding was provided through the Vocational Education Amendments of 1968.

The present revision (1974) is a continuing effort to develop and maintain a course of study that is flexible, relevant, and up to date. Our recommendation is to make necessary adjustments in this course of study to meet your local needs. It is important the agriculture instructor understands the purpose of this course of study to assist him and not a mandate of what must be taught.

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PHILOSOPHY

Vocational education programs in agriculture should be designed for and available to all students who express a career interest in the field of agriculture. Agriculture, in this context, includes occupations in three major areas: 1) production agriculture, 2) occupations providing services to production agriculture, 3) and those involved in transporting, processing and distributing agricultural production.

To serve an ever increasing diversified clientele, a vocational education program in agriculture must provide flexibility and a wide variety of settings. Essential to this program, however, is the principle of "learning by doing." A variety of methods can be used to provide practical experience either in the classroom, on the farm, or in various agricultural businesses and industry.

A committee of the WAVAI has prepared the following document to serve as a guide for the development of a vocational education program in agriculture in your school. Since we believe each community is different, and therefore requires a unique program to meet its education needs, we are encouraging you to *adapt*, not *adopt*, the suggested curriculum. It is our hope that this guide can assist you in the preparation of the program which best serves your particular situation.

MAJOR PROGRAM OBJECTIVES FOR VOCATIONAL AND TECHNICAL EDUCATION IN AGRICULTURE

1. To develop agricultural competencies needed by individuals engaged in or preparing to engage in production agriculture.
2. To develop agricultural competencies needed by individuals engaged in or preparing to engage in agricultural occupations other than production agriculture.
3. To develop an understanding of and appreciation for career opportunities in agriculture and the preparation needed to enter and progress in agricultural occupations.
4. To develop the ability to secure satisfactory placement and to advance in an agricultural occupation through a program of continuing education.
5. To develop the abilities needed to exercise and follow effective leadership in fulfilling occupational, social, and civic responsibilities.
6. To develop those abilities to human relations which are essential in agriculture occupations.

Major Objectives and Their Contributory Objectives:

The following section is designed to amplify and explain the major program objectives. The attainment of these objectives depend upon many contributory objectives.

Objective 1: To develop agricultural competencies needed by individuals engaged in or preparing to engage in production agriculture.

The attainment of this major objective requires competencies in one or more areas of plant science, animal science, soil science, agricultural business management, and agricultural mechanization. There are several different occupational levels at which individuals are engaged in production agriculture (owner-operator, manager, tenant, technician, laborer, etc.). Since the knowledge and skills needed at different levels vary, educational programs designed to prepare and upgrade individual workers must also vary in length and level of instruction.

Fulfilling this major objective requires coordination of the course of study and supervised occupational experience.

Specific teaching objectives should be established on the basis of the abilities required of an individual to make satisfactory management decisions and/or perform certain operations in production agriculture. These may be determined by making an analysis of the operative and managerial functions performed by successful farmers or operators of comparable agricultural production businesses.

The following contributory objectives are applicable to farmers and ranchers who produce food and fiber and to operators of greenhouses who produce food and ornamental plants. They also apply to individuals who are involved in the business of producing nursery stock, of landscaping and maintaining grounds, as well as those who grow trees for commercial purposes.

Foremost among contributory objectives are the abilities to:

1. Begin and advance in production agriculture.
2. Manage an agricultural business effectively by:
   a. Producing agricultural products efficiently
   b. Marketing agricultural products advantageously
   c. Financing an agricultural business successfully
   d. Providing for efficient agricultural buildings and mechanization
   e. Making decisions based upon the analysis of accurate and proper records
   f. Conserving soil and other natural resources
   g. Applying effective employee-employer relationships
   h. Making the most efficient use of physical and human resources in conducting the agricultural business, which may also involve supplemental or alternative sources of income.
3. Maintain a favorable home environment.

Objective 2. To develop agricultural compentencies needed by individuals engaged in or preparing to engage in agricultural occupations other than production agriculture.

The efficient production of agricultural commodities requires many goods and services usually provided by specialized businesses. The productivity of the agricultural economy will be influenced by the competencies of the workers in these businesses. Therefore, appropriate educational programs must be designed, not only for those who produce agricultural commodities, but also for those who are engaged, or will engage, in other agricultural occupations—the processing,

distribution, and service segments of agriculture.

Experience and training in production agriculture are either essential or highly advantageous for workers in all agricultural occupations.

Foremost among contributory objectives are the abilities to:

1. Understand and apply the principles of soil science, plant science, animal science, management, and mechanization as they relate to agricultural occupations.
2. Perform the managerial and operative activities necessary to enter and progress in an agricultural occupation by:
   a. Understanding the marketing and processing of agricultural products, and the provision of related services.
   b. Understanding the principles of selling supplies and providing services to meet specific needs of production agriculture.
   c. Understanding how agricultural businesses are operated and financed, and how these businesses render service to production agriculture.
   d. Understanding what is expected of an employee.
   e. Understanding employer policies and procedures.
   f. Maintaining effective customer relations.
   g. Respecting and wisely using the property of the employer.
   h. Preparing, maintaining, interpreting and using records and reports.
   i. Understanding, interpreting and following memorandums, manuals, and written policies and regulations.

Objective 3. To develop an understanding of and appreciation for career opportunities in agriculture and the preparation needed to enter and progress in agricultural occupations.

Modern agriculture is broad and complex, involving hundreds of professional and technical occupations which require extensive knowledge and highly developed skills, as well as some which require only relatively simple manipulative abilities. Current trends indicate that agriculture will become even more complex and specialized in the future. Thus, individuals aspiring to enter and/or progress in agricultural occupations should acquire knowledge concerning the types of jobs and their characteristics. This would include the number of annual employment opportunities, abilities required, beginning salaries, advancement opportunities, and promise of satisfaction.

In making a tentative occupational choice and beginning to prepare for it, the prospective worker must assess his/her individual characteristics and interests in relation to the requirements of the occupation and the employment opportunities it affords.

Foremost among contributory objectives are the abilities to:

1. Understand and appreciate the importance of agriculture to the nation's economy and its impact upon the daily lives of all citizens.
2. Determine the types and numbers of occupational opportunities in agriculture.
3. Evaluate information concerning agricultural occupations.
4. Study pertinent occupational information in relation to personal characteristics, attitudes, and interests.
5. Obtain exploratory work experiences in selected occupations under proper supervision.
6. Appreciate the need for pursuing a program of continuing education to keep abreast of and advance in the occupation.

Objective 4. To develop the ability to secure satisfactory placement and to advance in an agricultural occupation through a program of continuing education.

The main objective of students of vocational and technical education is successful entry and advancement in an occupation. For many occupations, vocational education in full-time high school classes, followed by part-time enrollment in post-high school classes, is sufficient for satisfactory placement and advancement.

An increasing number of agricultural occupations require technical or professional education. For students who desire placement at these levels, courses in high school designed to develop vocational competence, supported by other selected subjects, make up a desirable pre-technical or preprofessional program of instruction. Such preparation develops attitudes and abilities which enable the student to complete technical and professional programs successfully.

Recognizing the dynamic nature of agricultural occupations, no education program should be considered as terminal. Students must understand that continuous education will be a normal pattern for agricultural workers at all levels.

A student should be aware of occupational opportunities and requirements throughout his preparation for a chosen field. Instructors are primarily responsible for developing the student's

needed abilities. In fulfilling these responsibilities, they should enlist the aid of other competent persons.

Foremost among contributory objectives are the abilities to:

1. Utilize the services of appropriate agencies and organizations in locating and securing satisfactory employment.
2. Analyze opportunities for self-employment.
3. Analyze job opportunities and requirements, and assess personal abilities and interests in terms of these requirements.
4. Apply for employment and participate in employment interviews.
5. Plan and pursue a program of continuing education appropriate to the requirements of the vocations.
6. Make satisfactory progress and advancement in an occupation.

Objective 5. To develop those abilities in human relations which are essential in agricultural occupations.

Vocational and technical education is concerned with the optimum development of each individual. It is not limited to the development of specific and narrow occupational competencies. Therefore, it shares with other segments of education the responsibility for the development of essential human relation abilities. Occupational success is influenced by the interpersonal relationships between the worker, his co-workers, his employer, and society in general. In many instances the successful application of specific occupational competencies depends on effective human relations.

Foremost among contributory objectives are the abilities to:

1. Appreciate the dignity of work and the need for every individual to make maximum contributions toward his occupation, and to the advancement of his family, his community, and his nation;
2. Establish and maintain effective and ethical working relationships with associates;
3. Communicate effectively;
4. Appreciate and follow desirable behavioral standards;
5. Develop acceptable personal work habits.

Objective 6. To develop abilities needed to exercise and follow effective leadership in fulfilling occupational, social, and civic responsibilities.

In a democracy, every occupational area functions in a complex social setting. There is a need for developing constructive effective leadership abilities in all persons. Modern agriculture demands individuals who can provide leadership in developing programs and policies that will create and maintain an optimum climate for agriculture consistent with the general welfare.

Participation in intracurricular activities of the vocational agriculture student organization (Future Farmers of America) develops individual leadership and stimulates students to set and achieve worthwhile vocational goals. A national organization with state and local units provides a practical laboratory for developing democratic leadership, cooperation, and good citizenship.

Foremost among contributory objectives are the abilities to:

1. Associate with and become a functioning member of an organization.
2. Identify and participate in desirable activities for developing and improving agricultural leadership.
3. Initiate activities that improve agricultural and civic activities;
4. Cooperate for the common good in agricultural and civic activities;
5. Develop and maintain desirable relationships between rural and urban groups;
6. Participate in the development of local, state, national, and international policies and programs affecting agriculture.

CONDITIONS CONDUCIVE TO LEARNING

Learning for the student studying vocational education in agriculture is more than a matter of him compiling factual knowledge; it is a process of growth in which the student at each age level is presented with challenges. Some of these challenges come from within the student, others which come about by virtue of his living in a certain social scheme. As each challenge is presented the student must come to grips with it, learn how to cope with it, and learn the skills, understandings, and attitudes required to progress through it. Learning, then is a personal matter. It involves the learner's own needs and interest. It's an active process in which the learner reacts to a message.

1. MOTIVATION - A STUDENT LEARNS ONLY WHEN HE IS MOTIVATED TO LEARN. The motivation for some situations may arise from the individual's needs, interests, likes and dislikes. For others it may originate through incentives and awards. Learning for most students in vocational agriculture is a combination of both

these two drives. A vo-ag teacher supplements the natural interests of youth with appropriate incentives.

2. INVOLVEMENT-LEARNING IS EXPERIENCING. A vocational agriculture student learns from the acts that he performs, the words he uses, and the thoughts and feelings that he expresses. A vo-ag teacher involves students directly in experiences when ever possible.

3. ASSOCIATION-LEARNING IS MOST EFFICIENT WHEN IT PROCEEDS BY A DIFFERENTIATION OF A WHOLE INTO ITS PARTS. Parts derive their meaning from the whole. Material presented in this way is easier to learn than is isolated bits of information and facts. A vo-ag teacher insures that the material presented is organized into meaningful segments so that similarities and differences can be seen by the students.

4. REINFORCEMENT - LEARNING TAKES PLACE WHEN THE ACT (THINKING, FEELING, OR ACTING) THAT IS PERFORMED IS REINFORCED OR REWARDED. The most effective rewards are intangible relationships such as acceptance and approval. A vo-ag teacher accepts all students as possessing dignity and worth as individuals.

5. TRANSFERABILITY - KNOWLEDGE TRANSFERS FROM ONE SITUATION TO ANOTHER WHEN THERE ARE IDENTICAL ELEMENTS IN THE TWO SITUATIONS. A student cannot transfer or apply a principle to a situation with which he is not familiar. A vo-ag teacher discovers the prior knowledge and experience of the class members as he plans to introduce new units.

6. EACH INDIVIDUAL IS DIFFERENT FROM EVERY OTHER INDIVIDUAL. A vo-ag teacher designs each learning experience with the unique needs of the individual student in mind.

EVALUATING VOCATIONAL AGRICULTURE PROGRAMS

The effectiveness of a program in vocational agriculture is dependent to a large degree upon a continuous and critical evaluation of the results of the program. Daily observations provide a simple method of evaluation, but extensive, periodic examinations are necessary to develop a course of action that will most effectively utilize the manpower and resources of the department. Critical, unbiased appraisals of one's efforts require courage but provide the only reliable basis upon which to plan future development of the educational program. However, it should be recognized that evaluation results, good or bad, do not necessarily measure the success of the teacher or teachers in the department but also reflect the efforts of the community and those people who are responsible for administering the program.

The teachers and administrators are primarily responsible for directing program evaluation. The most logical procedure for continuous evaluation is through the local vocational education coordinator and the Agricultural advisory council. They usually attempt to measure the contributions of the agricultural education program to the individual, community, state and nation. In general, the following points are considered:

1. Is the program designed to satisfy community needs?
2. Is there adequate interaction between the local vocational education coordinator, advisory council and the teacher of agriculture?
3. Is the community informed as to the educational activities of the department? What are the community reactions to the program?
4. What are the attitudes of the students, businessmen, administrators, and board of education workers toward the program?
5. Does the educational program aid in the development of healthy attitudes, desirable interests, good judgment, and the ability to think, analyze and solve problems?
6. What proportion of the students become successfully established in farming, in allied agricultural occupations, or continue their education in the field of agricultural science?
7. Does the program embrace the whole concept of agriculture rather than only segments of the field?
8. Does the department recognize its responsibility to the needs of young and adult farmers of the community?
9. Are graduates assuming positions of leadership in agricultural, civic, social, and religious activities of the community?

SUGGESTIONS FOR USING THE CURRICULUM GUIDE FOR INSTRUCTION IN WISCONSIN HIGH SCHOOLS

The suggested course of study has been the result of revision of earlier forms by a large number of instructors in agriculture with assistance from the teacher education and supervisory staffs at the State level. Adaptation of time devoted to specific units must be made by the local instructor. Time ranges reflect the need to adjust specific units in accord to the needs of youth in various sections of the state. In some communities, the time devoted to teaching a unit should be extended and for some communities a unit might be reduced. Instructors, with justification, should consider offering units at different grade levels and during different seasons of the year than where indicated if such a re-arrangement will offer a better course of study organization for a particular community. For some communities it might conceivably be desired to delete units, add others, and revise the ones provided if it will make for a better course of study, meeting more adequately the needs and problems of youth enrolled in high school agricultural courses.

Beginning teachers should follow the suggested course of study closely. As they become more familiar with the needs, problems, and interests of their clientele they should gradually adapt the curriculum to meet the needs of a specific community. Instructors with experience are urged to use the new suggested course of study as a guide in organizing instructional units. Before the school year starts, the instructor should make definite plans, even though they would necessarily be tentative, as to the time and substance of each unit for the entire course of study. As progress is made during the instructional year, adjustments can be made as may be necessary and desirable.

Preparation for teaching is essential to achieve good, effective teaching. Planning and continuous upgrading and revision of teaching or lesson plans is a part of preparation. This course of study is a tool which hopefully will aid you in improving your instruction.

WISCONSIN PHILOSOPHY AND PROCEDURES IN DEVELOPING OCCUPATIONAL EXPERIENCE PROGRAMS IN VOCATIONAL AGRICULTURE/AGRIBUSINESS.

Since passage of the Smith-Hughes Act in 1917, supervised farming programs have provided the vehicle for carrying instruction in production agriculture to the "doing" stage. The objectives of vocational education in agriculture were broadened by the Vocational Education Act of 1963 and the 1968 Amendments to include preparation for careers for all people in any occupation requiring knowledge and skill in agriculture.

An important aspect of the total educational program in agribusiness occupations is the Supervised Occupational Experience of the students. "Supervised occupational experience programs in agriculture consist of all the practical agriculture activities of educational value conducted by pupils outside of class for which systematic instruction and supervision are provided by their teachers, parents, employers, and others."[1]

A supervised occupational experience program is an *integral* part of the total program of instruction in agriculture. It is not to be viewed as a separate entity and in no way should the student view this experience as a penalty for being enrolled in vocational agriculture. Instruction in the importance, advantages, objectives, and procedures associated with the supervised occupational experience program must be as diligent as for any of the subject matter areas.

Procedures

Supervised occupational experience programs in agriculture may be in the form of farming programs, work experience (including farm placement), simulated experience, and cooperative education programs. The following steps are suggested as a procedure in the development of supervised occupational experience programs in agriculture.

1. Orientation of parents, employers, and cooperating school personnel to the objectives, procedures, and desirable outcomes of the program.

[1] Phipps, Lloyd J., *Handbook on Agricultural Education in Public Schools*, The Interstate Printers and Publishers, Danville, Ill., 1972, Third Edition.

2. Instructor appraisal of the student's home circumstances and of his personal characteristics, competencies, and experiences.
3. Orientation of students individually and by classes.
4. Development of individual student programs.
    a. Survey and analysis of the farm or work experience station.
    b. Determination of student interests, needs, and objectives.
    c. Establishment of student goals.
    d. Budgeting and determination of agreements.
    e. Planning the details of the program.
    f. Development of appropriate records.
5. Evaluation of student-supervised occupational experience programs.
    a. Skills learned and information acquired.
    b. Scope and success of managerial experience.
    c. Initiative exhibited by the student.
    d. Degree of student interest and pride stimulated in agriculture as a career area.
    e. Progress toward establishment in an agricultural career or toward continued education in agriculture.
    f. Labor income or gain in assets from the occupational experience program.

The teacher of vocational agribusiness and natural resource occupations coordinates and conducts the foregoing activities with a view toward attaining the general objective of the program which is to prepare students for employment, establishment, or further education in an occupation, business, or profession requiring knowledge and skill in agriculture.

AGRIBUSINESS ACCOUNTING

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in agribusiness accounting and will be able to relate these factors to his/her own specific needs and aspirations.
B. Define and associate words and terms involving agribusiness accounts.
C. Prepare a net worth statement.
D. Develop a net income statement.
E. Prepare a labor income statement.
F. Compare the three methods of computing depreciation.
G. Prepare an inventory.
H. Analyze strong and weak points of a farm business by utilizing account records.
I. Prepare a complete federal and state income tax return.
J. Prepare an investment credit form.
K. Prepare a social security form.

II. Concepts to Develop

A. There are career opportunities in agribusiness accounting for young men and women at all levels of educational preparation.
B. Correct accounting procedures are beneficial to any business organization.
C. Record analysis should be performed periodically to determine strengths and weaknesses in the business.
D. A certain body of knowledge and skills are necessary in record keeping.
E. The preparation of tax returns requires skill in retrieving information from records and correct interpretation of internal revenue service guidelines.
F. There are four basic methods of doing business in the United States.

III. Subject Matter to Teach

A. Careers
    1. Current and future employment needs.
    2. Job description.
    3. Training requirements.
    4. Working conditions.
    5. Opportunity for advancement.
    6. Other factors relating to student needs and aspirations.
B. Comparative methods of doing business
    1. Individual proprietorship.
    2. Partnership.
    3. Profit corporation (including pseudo).
    4. Non-profit corporation.
C. Benefits derived from keeping records.
    1. Income tax.
    2. Know where you stand.

a. net-worth statement.
b. net income (yearly)
c. labor income.
d. analysis of strengths and weaknesses.

3. Tool for obtaining credit.
4. Division of profits (partnerships).

D. Basic terms used in keeping records
1. Income vs. expense.
2. Assets vs. liabilities.
3. Net income vs. labor income.
4. Net income vs. net worth.
5. Partial budgets.
6. Depreciation methods compared.
a. straight line.
b. double declining balance.
c. sum-of-the-year's digits.

E. Farm account exercise
1. Farm expense.
2. Farm income.
3. Farm inventories and depreciation.
4. Net income statement.
5. Net worth statement.

F. Analysis of above exercise (to include)
1. Dairy (profitable goals).
a. milk sold per cow (14,000#).
b. percent of feed purchased (25-35%).
c. Percent of cows in milk (90%).
d. Cows per man (40).
e. Buildings and equipment invested per cow ($800).
f. Veterinary and medicine per cow ($14).
g. Percent of calf loss (10% or less).

2. Crop (profitable goals)
a. Crop value per crop acre ($125).
b. Crop yields per acre (locally).
c. Crop expense per crop acre ($25).
d. Crop acres per man (140).
e. Fertilizer expense per crop acre ($18).

3. Profitability
a. Returns to labor and management.
b. Rate of return to capital invested (9%).
c. Operating income per $1.00 operating expense ($2.00).

4. Solvency
a. Ratio of current liabilities to current assets (.5).
b. Ratio of total liabilities to total assets (.5 to .6).

G. Types of taxes
1. Real estate or property tax.
2. Sales tax.
3. Income tax.

H. Federal income tax returns (Based on D above).
1. Form 1040 (schedule F) (farm income and expense).
2. Form 1040 (schedule D) (long term capital gains).
3. Form 1040 (schedule SE) social security.
4. Form 3468 (investment credit).
5. Form 1040 (individual).

IV. Motivation

A. Class presentations by personnel such as lawyer, accountant or successful farmer.
B. Films, slides and filmstrips.
C. IBM record sheets.
D. Visit an income tax office.
E. Field trips to local business operations to view accounting procedures.

V. Learning Activities

A. Occupational experience program.
B. Prepare tax returns on the home farm business or on a farm operation used as a class exercise.
C. Determine farm income and expenses from available farm records.
D. Establish production goals for the home farm or on a farm operation used as a class exercise.
E. Set up a depreciation schedule for machinery and equipment on the home farm or on a farm operation used as a class exercise.
F. Prepare net income and net worth statement from available farm records.

VI. Materials Needed

A. Books
1. Hamilton & Bryant. *Profitable Farm Management.* Prentice-Hall. 1963.
2. Mortenson & Luening. *Farm Management Handbook.* Interstate. 1972.

B. Bulletins and Pamphlets
1. "Guidelines for Analyzing the Dairy Farm Business," University of Wisconsin-Extension.
2. "Report of Farm Record Summaries," in cooperation with the Wisconsin Farm Management Association. University of Wisconsin-Extension.
3. "Wisconsin Farm Enterprise Budgets," University of Wisconsin-Extension.

C. Workbooks
1. *Vocational Agriculture Workbook,* No. 3. A. Pynnonen. Sheldon Book Co. Sheldon, Wisconsin 54766.
2. *University of Wisconsin Farm Accounting Book.* University of Wisconsin-Extension.

ANIMAL MANAGEMENT AND CARE — SMALL

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in small animal management and care and will be able to relate these factors to his/her own specific needs and aspirations.

B. Describe the history of small animal domestication.

C. Identify breeds and characteristics of small animals and their use.

D. List the major parts and explain the function of each system which makes up the anatomy and physiology of small animals.

E. List and be able to explain reproductive and breeding systems for each kind of small animal.

F. Describe the basic principles of nutrition involved with small animals.

G. List the major diseases and parasites of small animals and their control measures.

H. Plan a satisfactory system of sanitation for small animals.

I. Explain recommended housing and/or caging systems for small animals.

J. Demonstrate the correct handling and restraint of selected small animals.

K. Describe the procedures used in sexing of small animals.

L. Describe the kinds of record keeping necessary for small animal management.

M. Use and understand the terminology used in this career area.

II. Concepts to Develop

A. There are career opportunities in small animal management and care for young men and women at all levels of educational preparation.

B. Small animal domestication is not new.

C. The anatomy and the physiology of small animals, although complex, parallel all other vertebrae and mammals.

D. Reproduction and breeding of small animals is complex.

E. Small animals need proper nutrition.

F. Small animals are affected by diseases and parasites.

G. Housing for small animals is critical.

H. Special management procedures are developed for small animal care.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs
2. Job description
3. Training requirements
4. Working conditions
5. Opportunity for advancement
6. Other factors relating to student needs and aspirations

B. Employment opportunities which involve small animal care and management
1. Animal technician (veterinary assistant)
2. Animal caretaker
3. Small animal laboratory technicians
4. Pet store help or management
5. Veterinary profession
   a. Job duties for each
   b. Requirements for job entry in each
   c. Training required for each

C. The dominion of man over small and large animals
1. Early history of domestication
2. Animal classification and identification
3. Breed identification
4. Development and use of breeds

D. Kinds of small animals which require care and management
1. Laboratory animals
2. Dogs (canines)
3. Cats (felines)
4. Small stock and fur animals

E. Anatomy and physiology (by kinds)
1. The skeletal system
2. The respiratory system
3. The circulatory system
4. The digestive system
5. The endocrine system
6. The reproductive system
7. The nervous system
8. The excretory system
9. The muscular system
10. The skin

F. Reproduction and breeding (by kinds)
1. Physiology of reproduction
2. Reproduction in the male
3. Reproduction in the female
4. Breeding small animals

G. Nutrition and feeding (by kinds)
1. Basic principles of nutrition
2. Feed composition and measures of nutrient value
3. Routine and experimental feeding
4. Methods of feeding

5. Food consumption
6. Nutrient requirements

G. Diseases and parasites and their control
1. Common infections and noninfectious diseases
2. Transmission or spread of diseases
3. Disease diagnosis — general procedures
4. Common external and internal parasites
5. Noninfectious and miscellaneous ailments
6. Management practices, sanitation, and disease control

H. Housing and caging small animals
1. The animal house or housing facility
2. Animal cages
3. Feeding and watering equipment

I. Management of small animals
1. Handling and restraint
2. Sexing
3. Record keeping
4. Legal requirements

IV. Motivation

A. Field trips to animal shelters, veterinary clinics, pet stores and the like

B. Class presentations by veterinarians, animal technicians, animal shelter managers, pet store owners, and by individuals from educational institutions offering advanced training in this career area

C. Bulletin board displays

D. Slide and motion picture presentations on small animal care and management

V. Learning Activities

A. Occupational experience program.

B. By means of a flow diagram trace the history and use of one or more breeds of small animals

C. Develop a management outline for one kind of small animal

D. Collect literature and samples of small animal management aids (feeds, health, etc.)

E. Individual or panel reports on various aspects of small animal care and management

F. Raise and manage a cage of small animals within the classroom area or vicinity using recommended management practices and humane treatment.

VI. Materials Needed

A. Books

1. Animal Welfare Institute. *Basic Care of Experimental Animals.* New York, New York. 1970.
2. Arrington. *Introductory Laboratory Animal Science.* Interstate. 1972.
3. Campbell and Lasley. *The Science of Animals That Serve Mankind.* McGraw-Hill Book Co. 1969.
4. National Academy of Sciences — National Research Council. *Nutrient Requirements of Dogs.* Publication 989. Washington, D.C. 1962.
5. National Academy of Sciences — National Research Council. *Nutrient Requirements of Laboratory Animals.* Publication 990. 1962.
6. National Academy of Sciences — National Research Council. *Nutrient Requirements of Rabbits.* Publication 1194. 1966.
7. Scheid. *Raising Game Birds.* The Highsmith Co., Fort Atkinson, Wis. 1970.
8. Sims and Johnson. *Animals In the American Economy.* Iowa State University Press. 1972.
9. Templeton. *Domestic Rabbit Production.* Interstate. 1968.
10. Whitney. *The Complete Book of Cat Care.* Doubleday & Co. 1963.
11. Whitney. *The Complete Book of Dog Care.* Doubleday & Co. 1963.

B. Bulletins and Pamphlets

1. "Animal Technician Brochure" and information packet, Agricultural Division, Madison Area Technical College, Madison, Wisconsin.
2. "Bringing Up Pup" Armour Pharmaceutical Co. Chicago, Illinois.
3. "Dog Care Book" Polk-Miller Products Inc., Richmond, Virginia.
4. "Feeding and Managing Rabbits" Hubbard Milling Co., Mankato, Minnesota.
5. "Purina Rabbit Book," Ralston-Purina Co., St. Louis, Montana.

ANIMAL NUTRITION

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job description, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in animal nutrition and will be able to relate these factors to his/her own specific needs and aspirations.

B. List and discuss the basic nutrients and their functions.
C. Define the terms associated with feed analysis.
D. Identify on a drawing the parts of a digestive tract, describe functions of the parts of the digestive tract.
E. Describe in sequence the digestive processes.
F. Define major categories of nutrient use in the animal body, and to interpret and apply the NRC (National Research Council) tables concerning animal nutritive requirements.
G. List the specific thumb rules of feeding.
H. Identify symptoms of nutrient deficiencies.
I. Interpret and apply data of NRC on nutrient content of common feeds.
J. Formulate a balanced ration when given specific information.
K. List the economic advantages in the maximum use of home-grown feed.
L. Determine least cost rations using alternative feed supplements.
M. Interpret and compare ingredients listed on feed tags.
N. Correctly obtain feed samples for chemical analysis.
O. Interpret and apply information from chemical feed analysis.
P. List harvesting and storage alternatives, compare the quality of feed under alternative harvesting and storage systems.
Q. Identify new concepts in feeding.

II. Concepts to Develop

A. There are career opportunities in animal nutrition for young men and women at all levels of educational preparation.
B. Each basic nutrient has a function in the animal.
C. The nutrient value of feeds is determined by many factors.
D. The digestive system performs an important function.
E. Nutritive requirements of a feed determine its use.
F. Feeding is related to animal health.
G. Thumb rules of feeding have practical value.
H. A balanced ration is practical as well as economical.
I. Feed quality is affected by harvesting and storage methods.
J. Feeding practices change as new methods and technology are employed.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Introduction
1. Importance of good feeding.
2. Economic considerations.

C. Basic nutrients and functions.
1. Carbohydrates.
2. Fats.
3. Proteins.
4. Minerals.
5. Vitamins.
6. Crude components *i.e.*, fiber, ash, protein, fat.

D. Nutritive values of feeds (feed analysis)
1. Roughages (discuss forages common to area)
   a. Dry matter.
   b. Crude and digestible protein.
   c. Total digestible nutrients (TDN).
   d. Estimated net energy (ENE).
   e. Crude fiber.
   f. Minerals.
   g. Vitamins.
   h. Palatability factor.
2. Concentrates (discuss grains common to area).
   a. Dry matter.
   b. Crude and digestable protein.
   c. Total digestable nutrients (TDN).
   d. Estimated net energy (ENE).
   e. Crude fiber.
   f. Minerals.
   g. Vitamins.
   h. Palatability factor.

E. Ruminant digestive process.
1. Parts of digestive tract.
2. Functions of each part.
3. Digestive processes.
   a. Mechanical factors.
   b. Enzymes.
   c. Bacterial.

F. Simple stomach animal.
1. Parts of digestive tract.
2. Functions of each part.
3. Digestive processes.
   a. Mechanical factors.
   b. Enzymes.
   c. Bacterial.

G. Nutritive requirements of all classes of animals.
   1. Maintenance.
   2. Growth.
   3. Reproduction.
   4. Production.
   5. Herd health as affected by feeding.

H. Basic thumb rules of feeding.
   1. Roughage.
   2. Grain.
   3. Dry matter basis.
   4. As-fed basis.

I. Balancing rations.
   1. Nutritive requirements of animal.
      a. Protein.
      b. TDN.
      c. Minerals and vitamins.
   2. Home-grown feeds.
      a. Maximum utilization.
      b. Economics.
   3. Purchased feeds.
      a. Ration supplements, *i. e.*, protein, vitamins, minerals, additives.
      b. Roughages and grains.
      c. Economics.
   4. Analysis of commercial feeds.
   5. Analysis of home-grown feeds.

J. Feeding systems as effecting feed quality.
   1. Harvesting alternatives (Pasture included).
   2. Storage alternatives.

K. New developments.

IV. Motivation

A. Comparison of home feeding program to accepted standards.

B. Field Trips.
   1. Local feed mill.
   2. Outstanding farm in area.

C. Resource personnel— panel of farmers.

D. Interesting anecdotes.

V. Learning Activities

A. Occupational experience program.

B. Feed sample display.

C. Balance ration for average cow in home herd.

D. Use of dad's DHIA feeding guide.

E. Examine digestive tract from slaughtered animal.

F. Collection of feed tags for comparison.

G. Demonstration of least cost ration with use of computer.

H. On-farm forage and grain sampling.

I. Farm field trip comparing forage harvesting and storage alternatives.

J. Veterinarian speak to class on feeding as it affects animal health.

VI. Materials Needed

A. Books
   1. Cassard. *Approved Practices in Feeds and Feeding.* Interstate. 1971.
   2. Crampton. *Applied Animal Nutrition.* 2nd Edition. W. H. Freeman and Co. 1969.
   3. Diggins and Bundy. *Dairy Production.* Prentice-Hall Inc. 1969.
   4. *Doane's Farm Management Guide.* Doane's Agriculture Service. 1971.
   5. Foley, Bath, Dickinson, Tucker. *Dairy Cattle Principles, Practices, Problems, Profits.* Lea and Febiger. 1972.
   6. Morrison. *Feeds and Feeding.* Interstate. 1968.
   7. Reaves. *Dairy Cattle Feeding and Management.* John Wiley and Sons, Inc. 1967.

B. Bulletins and Pamphlets
   1. The following are available from the University of Wisconsin - Extension:
      A2309 - "Taking Good Forage Samples."
      A2286 - "If Cows Could Talk."
      A2266 - "UREA - Questions and Answers."
      A2251 - "A Comparison of Haylage and Wilted Grass Silage Plus Hay in Dairy Cow Diet."
      A2180 - "Using the Ohio Feed Guide."
      A2183 - "Selecting the Grain Mix Protein Level in Dairy Rations."
      A2169 - "High Moisture Ensiled Corn for Dairy Cattle."
      A2123 - "A Comparison of Two Concentrates for Lactating Dairy Cattle."
      Agriculture News Feature - New Holland Division of Sperry Rand.

C. Films and Filmstrips.
   1. "Rumen Story" - Ralston Purina Company, St. Louis.

D. Laboratory Manuals
   1. Vo-Ag Workbook #2 (Feed and Feeding Section) Pynnonen, A., Sheldon Book Co., Sheldon, Wisconsin 54766.

E. Periodicals
   1. *Animal Nutrition and Health.*
   2. *Dairy Herd Management.*
   3. *Farm Journal.*
   4. *Feedstuffs.*
   5. *Hoard's Dairyman.*
   6. *Journal of Dairy Science.*
   7. *Successful Farming.*
   8. *Wisconsin Agriculturist.*

BEEF PRODUCTION

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the beef industry and will be able to relate these factors to his/her own specific needs and aspirations.

B. Summarize in writing the history of the beef industry.

C. List the breeds currently in use and describe identifying characteristics.

D. Describe the systems of beef production.

E. Describe chronologically the management of the cow from prior to breeding through gestation, through calving.

F. Describe chronologically the management of the bull prior to breeding season, during breeding, and maintenance when not in use.

G. Describe chronologically the management of the calf including care at parturition, nursing to weaning, growing to maturity.

H. List and be able to identify — tools and equipment useful in beef production.

I. Construct a model, or draw a suitable efficient beef handling facility including a corral with sorting pens, chute and headgate.

J. Describe, draw, or build suitable housing for beef cows, feeder stock, and finishing cattle.

K. List diseases and parasites affecting beef cattle.

L. List symptoms, prevention, and treatment of the above.

M. Know current F.D.A. regulations of drugs and chemicals.

N. List and be able to identify animals and carcasses, according to U.S.D.A. market and cutability grades.

O. List 5 methods of marketing beef cattle and describe advantages and disadvantages of each.

P. Demonstrate proper showing and fitting of a beef animal.

Q. List advantages and disadvantages of selecting breeding stock according to:
   1. Type.
   2. Performance data.
   3. Pedigree.

II. Concepts to Develop

A. There are career opportunities in the beef industry for young men and women at all levels of educational preparation.

B. A knowledge of the characteristics of the traditional beef breeds is helpful in understanding contemporary trends in breeding.

C. Systems of beef production consist of the cow-calf operation, feeder calf to market, yearling to market and the production of breeding stock.

D. Management of the breeding herd begins with the selection and continues through care before and during breeding, gestation, calving, and lactation.

E. Three stages in the management of calves and young stock are calving to weaning, weaning to 750#, and 750# to maturity.

F. Beef facilities and their management will vary according to the system of operation, geographical and climatic conditions, and personal preference.

G. A sound health and sanitation program, consistent with state and federal regulations, is necessary in order to capitalize on sound management in all other aspects of the beef production program.

H. Marketing the end product is the final step in the beef production program.

I. Fitting and showing of beef animals allows the student to demonstrate selection and management skills acquired in class and at home.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Historical background of the beef industry
   1. Early development to present.
   2. Breeds. The characteristics of each.

C. Systems of beef production
   1. Cow-calf operations.
      a. calf to weaning.
      b. calf to finish.
   2. Feeder calf to market. (long term feeding).

3. Yearling to market. (short term feeding).
4. Breeding stock production.

D. Breeding stock management
1. Selection.
2. Before breeding.
3. Gestation.
4. Calving.
5. Lactation.
6. A.I.
7. Crossbreeding.

E. Calf and young stock management
1. Calving time to weaning.
2. Weaning to 750#.
3. 750# to maturity.

F. Beef facilities and their utilization

G. Health and sanitation
1. State and federal rules and regulations.
2. Disease and parasite control on the farm.

H. Marketing

I. Fitting and showing of beef animals

IV. Motivation

A. Field trips for selection of breeding stock and market cattle.

B. Field trips for buildings, equipment and other facilities.

C. Visuals on beef production.

D. Bulletin board display.

E. Field trips to agribusinesses associated with the beef industry.

V. Learning Activities

A. Occupational experience program.

B. Collection and interpretation of performance test data.

C. Management skills.

VI. Materials Needed

A. Books.
1. Ensminger. *Animal Science.* Interstate. 1969.
2. Ensminger. *Beef Cattle Science.* Interstate. 1968.

B. Bulletins and Pamphlets.
1. University of Wisconsin Publications:

A2429 - "Infectious Bovine Rhinotracheitis"
A2428 - "Bovine Virus Diarrhea"
R2401 - "Efficiency and Profit Differences of Angus, Charolais, and Hereford Cattle"
R2398 - "Feed Requirements"
A2387 - "Ration for Beef Cattle"
A2049 - "Preconditioning Feeder Calves"
A2048 - "Beef Feeding Costs of Heavier Weights"
A1B286A - "Beef Cattle Breeding"
FB2196A - "Finishing Beef Cattle"
FB2141A - "Dehorning, Castrating, Branding and Marketing Beef"
FB2126A - "The Farm Beef Herd"
LF536A - "Keeping a Cow"

C. *Films and Filmstrips*
1. "The Brangus Story." International Brangus Association.
2. "Charolais for Profitable Cross Breeding." Modern Talking Pictures.
3. "The Charolais Report." Modern talking Pictures.
4. "CO-RAL" Chemagro, Advertising Section.
5. "Impact: The Story of the Brahman Breed" (3940). Modern Talking Pictures.
6. "One Man's Approach to Beef Housing." U.S. Steel Corporation.
7. "Profit Insurance." Farm Film Foundation.
8. "Santa Gertrudis Breed Profit." Farm Film Foundation.
9. "What It Takes Is Time" (3946) Modern Talking Pictures.

D. *Periodicals*
1. *Better Beef Business.*
2. *Breed Association Publications.*
3. *Drovers Journal.*

CANNING INDUSTRY AND FOOD PROCESSING

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the food industry and will be able to relate these factors to his own specific needs and aspirations.

B. List and describe significant highlights of the history of food preservation.

C. Identify and compare the various constituents of food.

D. Contrast the deteriorative factors leading to food spoilage.

E. Compare the various food preservative methods.
F. Select the various unit operations used in the processing of a specific vegetable.
G. Explain the specific accomplishments of each unit of operation.
H. Comprehend significant laws and regulations associated with the food industry.
I. Discuss the various food-borne illnesses that could have their origin in the food processing chain.
J. Choose appropriate procedures for cleaning equipment.
K. Analyze new methods of food preservation and point out new foods on the market preserved by these methods.
L. Identify and list the various trade associations in the vegetable processing area.

II. Concepts to Develop

A. There are career opportunities in the canning and food processing industry for young men and women at all levels of educational preparation.
B. Foods vary in their nutritional content.
C. Various procedures and methods are utilized in processing food.
D. Quality controls result in a tasty food safe for human consumption.
E. Federal and state sanitation regulations are essential in the food processing industry.
F. Several methods of preserving food are utilized in the canning and processing industry.

III. Subject Matter to Teach

A. Careers
   1. Current employment information.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relative to potential employment.
B. Historical background of the food industry
   1. Early development to present.
C. The science of food preservation
   1. Constituents of food stuffs.
   2. Factors that lead to deterioration.
D. Unit operations in food processing
   1. Grading, cleaning and packaging.
   2. Methods of heat processing.
E. Quality factors and their measurement
   1. Testing equipment and methods of use.
F. Legal aspects of food processing
   1. Federal legislation.
   2. State legislation.
   3. OSHA
G. Sanitation
   1. Health rules.
   2. Procedures in local plants.
H. Trends in the food industry
   1. Latest technology.

IV. Motivation

A. Field trip to canning factory.
B. Factory employer class presentation.
C. Bulletin board displays.
D. Slide series on food processing.

V. Learning Activities

A. Occupational experience programs.
B. Design a flow diagram of a processing operation.
C. Check pH of canned materials.
D. Panel reports on various areas of food processing.

VI. Materials Needed

A. Books
   1. Joslyn & Heid. *Food Processing Operations. Their Management, Machines, Materials and Methods.* Avi Publishing Co.
   2. Potter. *Food Science.* Avi Publishing Co. 1968.
   3. Stare. *The Story of Wisconsin's Great Canning Industry.* Canning Trade, Baltimore, Maryland, 1949.
B. Bulletins and pamphlets
   1. "Announcements of Courses," Fond du Lac, Wisconsin: Moraine Park Technical Institute, VTAE District #10, Catalogue, Current Edition.
   2. "A Condensed History of the Science and Technology of Thermal Processing," Goldblith & Samuel. Institute of Food Technologists, Chicago, Illinois.
   3. "Fruit & Vegetable Processing Jobs," Wisconsin State Employment Service. Madison, Wisconsin.
C. *Films and Filmstrips*
   1. "Agribusiness is Everyone's Business" BAVI. 6804.
   2. "Careers in Food Science & Technology" Institute of Food Technologists, Chicago, Illinois.
   3. "Rewarding Careers in a Dynamic Industry" BAVI. 7409.
   4. "Why Foods Spoil" BAVI. 4081.
   5. "Wisconsin Agriculture" BAVI. 4129.
D. *Laboratory Manuals*
   1. *Laboratory Manual for Vegetable Processing Instruction.* Seemann &

Koene. Moraine Park Technical Institute. Fond du Lac, Wisconsin.

2. National Canners Association. *Laboratory Manual for Food Canners and Processors*, Vols. I and II. Westport, Conn. Avi Publishing Co.

E. *Periodicals*
   1. *Canner/Packer.*
   2. *Food Engineering.*
   3. *Food Product Development.*
   4. *Food Technology.*
   5. *Quick Frozen Foods.*

CAREER OPPORTUNITIES IN MODERN AGRICULTURE

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Define in writing the terms agribusiness and farming.
B. List 6 factors that make agriculture our largest industry.
C. Compile a written description of the 6 clusters of agriculture occupations.
D. Appreciate the world's need for agriculture.
E. Be sensitive to the vastness of agriculture in the U.S.A.
F. Explain the complexity of agriculture in Wisconsin.
G. Trace food and other agricultural products from the producer to the consumer.
H. Identify jobs associated with the production, marketing, and distribution of agricultural products.
I. List 18 types of agencies and companies in Wisconsin that produce, market or distribute agricultural products.
J. Understand how local agribusiness relates to agribusiness in Wisconsin and the nation.
K. Formulate the important steps in preparing for a career in agriculture.
L. Identify 5 sources of occupational information in school.
M. Select 4 sources of occupational literature.
N. Organize a list of 7 attributes of one's life style that are determined by an occupation.

II. Concepts to Develop

A. Agribusiness includes farming.
B. Agribusiness is a large, vast and complex industry.
C. Agribusiness has a large number of occupations.
D. A raw product from the farm produces jobs as it is processed and marketed.
E. Many companies provide agricultural opportunities.
F. A good career decision requires planning.
G. One's choice of an occupation decides a great deal about one's lifestyle.

III. Subject Matter to Teach

A. The agricultural industry - our largest
   1. A two way street.
      a. produces and distributes raw products.
      b. consumes products produced by other industries.
   2. 5-8 percent produce raw products.
   3. Over 6 million workers manufacture and sell farm supplies.
   4. Over 9 million workers process and distribute farm products.
   5. Farmers sell:
      a. $13.1 billion worth of cattle and calves.
      b. $4.5 billion worth of hogs.
      c. $6.5 billion worth of dairy products.
      d. $6.6 billion worth of grains and hay.
   6. Farms spend:
      a. $ 7.1 billion for feed.
      b. $10.5 billion for seed, interests and other current operating costs.
      c. $ 4.3 billion for livestock.
      d. $ 2.1 billion for fertilizer and lime.
   7. Agribusiness consumes:
      a. steel.
      b. rubber.
      c. petroleum products.

B. Agricultural occupations in which people engage:
   1. Agricultural production.
   2. Agricultural Supplies/Services.
   3. Agricultural Mechanics.
   4. Agricultural Products (Processing, inspection, and marketing).
   5. Ornamental Horticulture.
   6. Agricultural Resources.
   7. Forestry.

C. World need for agriculture
   1. World population.
      a. growth rate.
      b. number of people.
      c. location of people.
      d. location in relation to food production.

2. World land utilization
   a. crop land.
   b. grazing land.
   c. cities, tundra, roads, forest, etc.
   d. cultivated land available.
3. World levels of food production.

D. Agriculture in the U.S.A.
1. Agriculture varies widely in the U.S.A.
   a. dairy.
   b. wheat.
   c. corn.
   d. cash grain.
   e. cotton.
   f. tobacco.
   g. beef - range.
   h. beef - feedlot.
   i. forest.
2. U.S. Population.
   a. total numbers.
   b. location and density.
3. Getting food from producer to consumer.
   a. cycle of a product.
   b. number of jobs.

E. Agriculture in Wisconsin*
1. Agriculture varies widely in Wisconsin.
   a. Southeast.
   b. Southcentral.
   c. Eastcentral.
   d. Central.
   e. Southwest.
   f. Westcentral.
   g. Northwest.
   h. Northcentral.
   i. Northeast.
2. Types
   a. General.
   b. Field crops.
   c. Livestock and poultry.
   d. Dairy.
   e. Speciality crops.
3. Wisconsin Population.
   a. Total.
   b. Location and density.
4. Getting food from producer to consumer.
   a. Trace a product like milk from producer to consumer pointing out other products made from it.
   b. Number of agriculture jobs.
5. Wisconsin's agribusiness.
   a. Film-"Agribusiness is Everybody's Business."

*Use latest copy of Wisconsin Agricultural Statistics, Wisconsin Department of Agriculture.

6. Companies in Wisconsin that produce, manufacture or distribute an agricultural product or service.
   a. chemical companies.
   b. credit agencies.
   c. dairy companies.
   d. electric companies.
   e. cooperatives.
   f. farm machinery companies.
   g. feed, seed, and grain companies.
   h. food stores.
   i. insurance companies.
   j. meat packing companies.
   k. processors.
   l. public agencies.
   m. government agencies.

F. Agriculture in your county, township or school district (make outline similar to the one above using data from census and agricultural statistics).

G. How to prepare for a career in agribusiness.
1. Planning.
   a. courses in school.
   b. talk to resource people.
   c. job experience.
   d. talk to parents.
2. Plan for flexibility.
   a. plan for "clusters" of occupations.
   b. get education as well as experience.

H. Sources of occupational information.
1. School.
   a. vo-ag teacher.
   b. other teachers.
   c. counselor.
   d. guidance office.
   e. principal.
2. Occupational literature.
   a. dictionary of occupational titles.
   b. professional and technical schools.
   c. state employment agencies.
   d. library.
   e. periodicals.
   f. want ads in newspapers.
   g. special bulletins.

I. Your occupation determines your life style.
1. car.
2. house.
3. neighborhood.
4. friends.
5. income.
6. education for children.

IV. Motivation
A. Bulletin Board about Careers.
B. Resource People from the Community.
C. Guidance personnel.

D. Career sheets, career profiles and other factual information about jobs in agriculture.

V. Learning Activities

A. Map locating local agricultural businesses.
B. Visit one or more local businesses.
C. Search want ads for jobs in agriculture.
D. Map of agriculture in Wisconsin.
E. Construct a history of an agricultural project.
F. Interview job holders in the community.

VI. References

A. Books.
1. *Agriculture in Our Lives* — Krebs, Interstate, 1973.
2. *Careers in Agribusiness and Industry* — Stone, Interstate, 1970.
3. Agriculture Yearbooks — 1959, 1960, 1963, and 1966.
4. FAO Yearbooks — 1959, "Our Livestock — Meat and Milk."

B. Pamphlets.
1. "Midwest Agribusiness," Wisconsin Department of Agriculture, Madison.
2. "Wisconsin Agricultural Statistics," Wisconsin Department of Agriculture, Madison.
3. "Wisconsin Cash Receipts from Farm Marketing," Wisconsin Statistical Reporting Service, Madison.
4. "I've Found My Future in Agriculture," *Hoard's Dairyman*, Fort Atkinson, Wisconsin.

C. Films.
1. "The Agriculture Story," #3899 BAVI, Madison
2. "Tomorrow's Food Power." Farm Film Foundation. 1425 H. Street, N.W. Washington, D.C. 20005
3. "Agribusiness is Everybody's Business" - #6804, BAVI
4. "Careers in Agriculture," F4406, BAVI
5. "Dynamic Careers Through Agriculture." Farm Film Foundation
6. "It's Up to You . . . Choosing a Career," #7410, BAVI
7. "Planning Your Career," #3025, BAVI
8. Vocations In Agriculture." #6208, BAVI
9. "Your Earning Power," #2565, BAVI

CARPENTRY, AGRICULTURAL

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the agricultural carpentry industry and will be able to relate these factors to his/her own specific needs and aspirations.
B. Perceive the importance of safety when working with hand and power tools.
C. Calculate bills of material.
D. Maintain an orderly shop.
E. Recognize common building materials and hardware and know their uses and limitations.
F. Be familiar with the nomenclature and standard terminology for building parts.
G. Understand accepted construction principles.
H. List and identify the standard types of building designs, and the advantages and limitations of each.
I. Draw and construct to scale a project of the student's choice.
J. Recognize and appreciate good craftmanship and construction.

II. Concepts to Develop

A. There are career opportunities in agricultural carpentry for young men and women at all levels of educational preparation.
B. A constant awareness of safety is needed by all persons at all times.
C. Quality materials plus quality construction results in a quality product.
D. Success in agricultural carpentry is dependent on the skills and techniques mastered by the individuals.
E. Wood working tools which are in excellent condition are the safest to use.
F. A neat and orderly shop contributes to a worker's safety and efficiency.
G. Thorough planning should precede all construction projects.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.

2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Safety in the agricultural carpentry field
1. The general safety rules for the shop.
2. Safety instructions for the use of hand and power tools.
3. Safety regulations when working with electricity.
4. Safety concepts and regulations which apply to the occupational field (OSHA).

C. Tool identification and conditioning
1. Identification of hand tools.
2. Identification of power tools and component equipment.
3. Conditioning and repair of tools and equipment.
4. Demonstration of current usage.

D. Bill of materials
1. What is a bill of materials?
2. Proper form.
3. Calculation of board feet.
4. Calculation of square and running board feet.
5. Estimating labor requirements.
6. Computation of costs.

E. Shop arrangement
1. Storage facilities for hand and power equipment.
2. Proper shop usage and layout.
3. Lumber, metal, and materials storage.
4. Inventory for equipment and materials.
5. OSHA standards.

F. Identification of building materials and their uses.
1. Characteristics of woods, metals, concrete and other construction materials.
2. Grades of lumber and defects.
3. Plywood and other fabricated products.
4. Wood and metal fasteners.
   a. nails
   b. screws, hinges, and miscellaneous hardware
   c. adhesives
   d. timber connectors
   e. glue
   f. concrete fasteners
   g. bolts
5. Matched lumber and millwork.

G. Construction practices
1. Building nomenclature.
2. Foundations.
3. Framing.
   a. sills
   b. joists
   c. plates
   d. subflooring
   e. studding
4. Framing openings.
5. Sheathing, siding, flashing.
6. Roof framing.
7. Roofing.
   a. materials
   b. applications
8. Finish.
   a. exterior
   b. interior
   c. floors
   d. trim

H. Construction principles.
1. The right material for the job.
2. State, county, and local codes.
3. Stress and strength.
4. Bracing and supports.

I. Building designs
1. Names and types of building design.
2. Names and type of roof design.
3. Pole buildings.

J. Planning the project
1. Basic drawing and design.
2. Scale drawing.
3. Measurement and layout.

K. Trends in the agricultural carpentry industry

IV. Motivation

A. Field trip to a local lumber company.
B. Field trip to various building sites.
C. Local building contractor class presentation.
D. Bulletin board displays.
E. Slide series on principles of building construction.
F. Slide series of former students' projects.
G. Films and filmstrips.

V. Learning Activities

A. Have students spend one or more days working for or observing a lumber yard, building contractor, saw mill, building inspector, real estate salesman, carpenter, mason, or similar occupation.
B. Conduct a safety check of all shop tools and equipment.
C. Take an inventory of all shop tools and equipment.
D. Design a shop layout plan for each student's home shop or proposed shop.
E. Compile a tool and equipment list for a complete shop along with costs for each item.

F. Collect various types of fasteners and mount them for future use.
G. Construct a simple shop project that develops and measures as many of the various skills as possible.
H. Provide an opportunity for students to evaluate each other's projects.
I. Select and arrange for a large building project, such as a garage, outbuilding, greenhouse, storage shed, or similar building that can be constructed as a class project.
J. Select various projects and have the student determine the cost of materials.
K. Construct scale model buildings on a cutaway design showing the various construction components.
L. Have each student design and construct a project of his or her choice.
M. Cut and construct rafters, stairs, and lay roofing on a scale model.
N. Cut and construct rafters, stairs, and lay roofing, as a part of his/her occupational experience program.

VI. Materials Needed

A. Books
1. Ashby, Dodge, Shedd. *Modern Farm Buildings.* Prentice Hall. 1959.
2. Groneman. *General Woodworking.* McGraw-Hill Book Co. 1959.
3. Howell, Coggin, Gites. *Building and Equipping the Farm Shop.* Interstate. 1956.
4. Mix, Cirou. *Practical Carpentry.* Goodheart-Willcox Co. 1963.
5. Schmidt, Lewis, Olin. *Construction Principles, Materials, and Methods.* American Savings and Loan Institute Press. 1970.
6. Ulrey. *Building Construction and Design.* Howard W. Sams & Co. 1970.
7. *Stanley Tool Guide.* Stanley Tools: Division of the Stanley Works, Education Department, New Britain, Connecticut.
8. *Tool Identification Manual.* Vocational Education Productions.

B. Bulletins and Pamphlets
1. "Safety in the Agricultural Mechanics Shops," University of Illinois, College of agriculture, Vocational Agricultural Service. Urbana, Illinois.
2. "Selecting Lumber and Other Building Materials," University of Illinois. College of Agriculture, Vocational Agricultural Service, Urbana, Illinois.
3. "Sharpening Hand Tools," University of Illinois, College of Agriculture, Vocational Agricultural Service, Urbana, Illinois.

CHOOSING A CAREER

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Write about six reasons why people work.
B. Define in writing such terms as interests, ability, aspiration, and aptitude.
C. Discover and describe orally some of his/her primary interests, abilities, aspirations, and aptitudes.
D. Analyze and classify work following one of the classification schemes.
E. Relate attributes of self to work by compiling lists of jobs and analyzing for their personal appropriateness.
F. Design a list of factors that one should consider in selecting an occupation.
G. Evaluate one or more jobs using a survey form similiar to the one included with this unit.
H. Formulate a plan that will enable him/her to graduate from high school and seek a job in his/her chosen area or additional education.

II. Major Concepts

A. A person chooses a career-occupation-job based on an intermix of such things as interests, abilities, aspirations, and aptitudes.
B. People work for a variety of reasons.
C. Work is classified.
D. Jobs may be analyzed for their appropriateness for you.
E. Planning to achieve what you want is as important as deciding what you want.

III. Subject Matter to Teach

A. Why People Work
1. Income.
2. Success.
3. Security.
4. Service.
5. Working conditions.
6. Creativity.
7. Companionship.

B. Personal attributes
1. Interests.
2. Ability.

3. Aspiration.
4. Aptitude.

C. Your occupational development
   1. Examine self for interests, abilities, aspirations and aptitudes. (Use Sextant Profile, Kuder Preference Test, etc.).
   2. Classification of work
      a. Type: White collar - Blue collar.
      b. Level: Managerial, professional, technical, skilled, semi-skilled, unskilled.
      c. Industry: medical, building and trade, professional, protective services, recreation, etc.
   3. Developing insights into self and work
      a. List jobs or occupations where your interests can be used.
      b. Add to the list jobs or occupations that you aspire to.
      c. Eliminate from the list those jobs or occupations that you do not possess an aptitude for (making the best decision you can at this time about your aptitudes).
      d. Circle these that you currently possess the ability for or have an interest in obtaining the ability.
      e. Group the jobs or occupations by one of the work classification schemes.
      f. Ask yourself a lot of questions about your list such as:
         How many require training beyond high school, how many of them would require moving out of town, how many pay by the hour, how many are in the service area, how many are in the unskilled area, how many are like the job you father has.

D. Considerations when choosing an occupation?
   1. Nature of the occupation.
   2. Satisfaction.
   3. Financial rewards.
   4. Personal qualifications.
   5. Opportunities.
   6. Education and training needed.
   7. Location of training and education opportunities.
   8. Location of employment opportunities.

E. Survey of an occupation
   1. Name of the career or career field.
      a. DOT number.
      b. Name most often used for this job.
      c. Other names for the job.
   2. History of this career or career field.
   3. People in this career
      a. Approximately how many people are now employed in this career field.
      b. What are the current employment trends.
      c. Where are jobs related to the field most often found? Why?
   4. Duties of this career
      a. General duties.
      b. Specific duties.
      c. Hours.
      d. Is there anything unusual about the number of hours or nature of the work schedule which might relate to this career field (seasonal fluctuations, days, nights, split shifts, etc.)?
   5. Qualifications of workers in this career field
      a. Sex.
      b. Age.
      c. Health and physical.
      d. Personality.
      e. Experience.
      f. Aptitudes.
      g. Education (general level and type).
      h. Other.
      i. Summarize a profile of this job if one can be found. (See Sextant Profile for example.)
      j. What are the common methods of entry into this career.
      k. Which entry method would you choose? Why?
   6. Educational planning
      a. Develop a high school program for the rest of your schooling that would be the best preparation for this career.
      b. Is post-secondary education essential, optional or unnecessary for this job? Give specific examples.
      c. If you decide to attend a post-secondary school, what entrance requirement might you expect? What program would you expect to take? What is the length of training? Cost? Where are the programs available?
      d. Other training such as 4 years of college or an apprenticeship? Where? Cost? Length?

7. Finding a job in this career or career field
   a. Legal requirement for entry into this field?
   b. Public and/or private employment agencies that might be helpful in securing a job in this field.
   c. Newspaper ads (attach several ads pertaining to this field).
   d. List four local firms where employment in this career field could be found.
   e. Who would you use as references if they were required?
   f. Write a sample letter of application.
8. Related fields
   a. List and briefly describe several career fields related to the one you have chosen to explore.
9. Earnings
   a. How much can you expect to make from this career?
      1. Beginning salary.
      2. Average salary.
      3. Exceptionally good salaries.
   b. What expense such as a uniform and travel might you have to meet in following this career?
10. The nature of the job
   a. List some benefits other than salary that you would expect to gain from this career.
   b. Are there any hazards?
   c. What demands would this career place on a family (your wife and children)?
11. Career advancement
   a. What are the opportunities for advancement in this field?
   b. Would advancement require additional training? Explain.
   c. Would advancement likely require moving to another location?
12. Arrange an interview with someone employed in this field. Write a short summary of that interview.
13. Now that you have studied this career would you be interested in entering it?

F. Planning
   1. Make a list of job clusters that interest you.
   2. Develop a plan of courses, experiences, part-time jobs, and post-high school training that will allow you to seek jobs of this type when you complete your education or training.

IV. Motivation

A. Bulletin board display.
B. Career posters.
C. Resource people from the community.
D. Former students who are now in vocational school, college or employed locally.
E. Tour factories/farms and talk to workers.

V. Learning Activities

A. Short community survey to find out why people work.
B. Complete a Sextant Profile, a Kuder Preference Test or some similar instrument that reveals career interests, abilities, etc.
C. Short community survey to classify jobs available in your community.
D. Complete a personal survey of an occupation (see section E of this unit for a suggested guide).
E. Interview working parents.

VI. Materials

A. Books
   1. *Agriculture in Our Lives* — Krebs, Interstate, 1973.
   2. *Careers in Agribusiness and Industry — Stone* Interstate, 1966.
   3. *Guidance in Agriculture Education* — Byran, Interstate, 1966.
   4. *Guidance for Youth* — Grant, et al., Thomas Publishing. Kaukauna, Wisconsin. 1965.

B. Pamphlets and Bulletins
   1. "Exploring Your Future." Sextant Systems, Inc. P. O. Box 1234, Milwaukee, WI 53201 (especially the books on agriculture; recreation parks and youth services).
   2. "Career Choices of Rural Youth in Changing Society." (LCRP #142, Agricultural Experiment Station, University of Minnesota).
   3. "I've Found my Future in Agriculture." Hoard's Dairyman, Fort Atkinson, Wisconsin.
   4. Material from Colleges of Agriculture and Life Sciences, Madison, Platteville, and River Falls.

C. *Films*
   1. "Jobs for Men: Where Am I Going," #7598, BAVI
   2. "Jobs for Women: Where Are You Going, Virginia," #7563, BAVI

3. "Salesmanship: Career Opportunities." #6491, BAVI
4. "You and Your Work." #2511, BAVI
5. Society For Visual Education, 1345 Diversey Parkway, Chicago, IL 60614 (Order a catalog. Has many filmstrips and records that may be of interest such as "An Introduction to Vocation," and "The World of Work")

COMMUNICATIONS, AGRICULTURAL

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in agricultural communications and will be able to relate these factors to his/her own specific needs and aspirations.

B. Discuss the evolution and current status of the agricultural communications industry.

C. Understand the effect of modern agricultural communications on profitable farm management.

D. Identify and list the various media employed in agricultural communications.

E. Understand how to use the "print and broadcast" media in making everyday farm operational decisions (*i.e.*, marketing information, weather information, farm news, and farm product advertising).

F. Recognize the importance of farm advertising in effective farm product marketing.

G. Comprehend the value and practical application of such farm advertising devices as: farm name, farm sign, farm business stationery, display advertising and classified advertising.

H. Understand the basic laws and regulations pertaining to the usage of farm advertising and farm media.

I. Design a farm office and estimate the approximate cost, equipment used therein.

J. Be familiar with specific agricultural communications media in their respective areas (*i.e.*, farm magazines, daily and weekly newspapers, radio stations, television stations, and names of farm editors and farm directors).

II. Concepts to Develop

A. There are career opportunities in agricultural communications for young men and women at all levels of educational preparation.

B. Agricultural communications play a vital role in a successful farm operation.

C. Specific techniques are needed to improve agricultural communications to and from the farm.

D. Numerous laws and regulations govern the agricultural communications industry.

III. Subject Matter to Teach

A. Careers
   1. Career and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Introduction to the agricultural communications industry
   1. History.
   2. Scope (current).
      a. Newspapers.
      b. Radio and TV stations.
   3. Effect upon modern agriculture.
      a. Farming and ranching.
      b. Agribusiness firms.
   4. Effect upon the general public.
      a. Consumers.
      b. Government.
   5. Media
      a. Print.
      b. Broadcast.
      c. Others ("word of mouth," signs, exhibits, and demonstrations).
   6. Benefits
      a. Current market information.
      b. Farm news (help make management decisions).
      c. Weather status and predictions.
      d. Aid to selling and buying (farm products and farm equipment).
      e. "An informed public is a willing public."

C. Farm advertising as a communication tool
   1. Historical background.
   2. Relation to agricultural marketing.

3. The Five "M's" of agricultural advertising.
   a. Market.
   b. Motives.
   c. Media.
   d. Message.
   e. Measurement.
4. Psychology of sales.
   a. Sales theories.
   b. Steps of a sales campaign.
   c. Handling different types of customers.
5. Advertising devices.
   a. Farm name.
   b. Farm sign.
   c. Farm business stationery.
   d. Displays and signs.
   e. Exhibits and demonstrations.
   f. Classified ads.
6. Advertising campaigns.
   a. Audience selection.
   b. Media selection.
   c. Timing.
   d. Costs.
   e. Use of outside advertising agency.
   f. Evaluation.
7. Laws and regulations
   a. Truth.
   b. Bad taste.
   c. Lottery.
   d. Right of privacy.
   e. Libel.
   f. Copyright.
   g. Trademarks.

D. The farm office
   1. Justification for.
   2. Location.
   3. Layout.
   4. Equipping.
      a. desk and chair.
      b. file cabinets and safe.
      c. adding machine.
      d. telephone.
      e. tape recorder, etc.

E. Trends in the agricultural communications industry
   1. Personnel.
   2. Training requirements.
   3. Technological advances.
   4. Effects upon production farming and agribusiness.

IV. Motivation

A. Field trips to local weekly newspapers, daily newspapers, radio and television stations and advertising agencies.

B. Observation of or actual participation in a radio or TV farm broadcast.

C. Class presentation by a resource speaker representing the press and broadcast media.

D. Movies or sound film strip-slide presentations on agricultural communications.

E. Bulletin board displays.

F. Literature from Wisconsin Press Association and the National Association of Farm Broadcasters, etc.

V. Learning Activities

A. List all local agricultural communications media in the area including the names of key contact persons with each of the specified media.

B. Deliver a speech or write a short paper on the history and current status of communications in agriculture.

C. Interview a member or members of the print or broadcast media to find out about job opportunities, qualifications for position, course preparation, working conditions, advantages and disadvantages of the job.

D. Write a classified ad advertising an actual farm product (examples - a used farm machine, hay, herd sire, calves, wood, land).

E. Choose an official name for their parent's farm or own future farm. Check regulations to learn how a name is protected by registering it with the County Register of Deeds.

F. Design an appropriate and attractive letterhead for official farm stationery.

G. Write a business letter promoting a product, requesting information, or other appropriate simulated or actual practical exercise involving agriculture using proper format and style.

H. Design and construct an attractive farm sign using the farm name.

I. Design a layout of a farm office including a list of equipment that should be in this office with approximate price of each item.

J. Outline a detailed advertising campaign to promote a farm product (*i.e.*, purebred stock, cash crops like honey and wood, recreational use of the land like snowmobile trails, hunting, etc.). Select the media, design the message and finally evaluate the campaign. Note: for purebred stock example, first select an

appropriate prefix to identify the herd.

K. Set up an exhibit or demonstration promoting an agricultural product or other agricultural subject.

L. Write news releases in class about community agricultural events, submit to local newspapers and radio/TV stations.

M. List professional agencies agricultural communicators can affiliate with and provide background information about each organization.

Examples:
- ARC - Agricultural Relations Council
- AAEA - American Agricultural Editors Association
- AAACE - American Association of Agricultural College Editors
- NAFB - National Association of Farm Broadcasters
- NFEA - National Farm Editors Association
- WPA - Wisconsin Press Association

VI. Materials Needed

A. *Books*

1. *Advertising and Promotion.* Class Unit (Student Manual and Teacher's Guide), AGDEX 920/40, Ohio Agricultural Education Curriculum Materials Service, 1971.
2. *Agricultural Salesmanship* Unit 4. Student's Manual, William Losher, Owosso, Michigan, 1969.
3. *Agriculture* - Sextant Series (75 agriculture job opportunities), 1971.
4. *Agri-Industry Careers.* (Lesson Plan #15 - "Communicating in the Agricultural Field"), Successful Farming Vo-ag Teaching Unit, 1970.
5. *Careers in Agribusiness and Industry.* Interstate, 1970.
6. *Career Information,* Block, 1971.
7. *Farm Advertising and Salesmanship.* A resource unit and study guide. Dept. of Agricultural and Extension Education, College of Agriculture and Life Sciences, University of Wisconsin, Madison, November, 1963.
8. *Handbook of Agricultural Occupations,* Hoover, Interstate, 1969.
9. *Selling and Salesmanship,* Class Unit (Student Manual and Teacher's Guide), Ohio Agricultural Education Curriculum Materials Service, 1971.
10. *The Five M's of Agricultural Advertising.* Douglas Sorenson, University of Wisconsin Press, Madison, 1967.

B. Directories

1. *Directory and Rate Book—Wisconsin Newspapers.* Wisconsin Press Association, Madison, current edition (revised annually). Note: 2 directories avaliable—dailies and weekly & semi-weekly.
2. *Directory of Communicators in Agriculture.* Agricultural Relations Council, Chicago, current edition (revised periodically).

C. Visual aids

1. "Agricultural Communications in the U.S.A.," Slide Set, No. A-19, USDA, 1965.
2. "Better Half of Farming," New Holland.
3. "Classified — Everyone's Market Place," Copley Productions.
4. "Farm Letterheads," Slide set, University of Wisconsin Department of Agriculture Journalism.
5. "Farm Office," Slide Set, Agriculture Division, Moraine Park Technical Institute.
6. "Farm Signs," Slide Set, University of Wisconsin Department of Agriculture Journalism.
7. "Look at Education Exhibits," BAVI
8. "Look Who's Talking," American Dairy Association.
9. "Newspaper Serves Its Community," BAVI.
10. "Television in Your Community," BAVI.
11. "Pictures the Thing," Association Films.
12. "Promoting Lamb and Wool," Sterling Movies.
13. "Salesmanship in Agriculture Business," slide film No. 391, VAS, University of Illinois.
14. "The Golden Standard," Modern Talking Pictures or Audit Bureau of Circulations.
15. "USDA Information for All," slide set, No. A-8, USDA, 1965.
16. "Who Wrote That," Association Films.

CONCRETE INDUSTRY

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the concrete industry and will be able to relate these factors to his/her own specific needs and aspirations.
B. Summarize in writing the history, manufacture and types of portland cement.
C. Comprehend the fundamental relationships between cement, water and aggregates.
D. Explain the properties desired in plastic and hardened concrete.
E. Describe the types and uses of concrete.
F. Understand the standard tests used to determine the quality of concrete.
G. Discuss the methods of specifying ready-mixed concrete for specific uses.
H. Explain the proper use and care of tools used to place and finish concrete.
I. Determine the amount of concrete needed for a job.
J. Use proper placing procedures under various weather conditions, including use of reinforcement, finishing techniques, and control joints.
K. Employ proper concrete masonry construction techniques.

II. Concepts to Develop

A. There are career opportunities in the concrete industry for young men and women at all levels of educational preparation.
B. A knowledge of the history, manufacture and types of portland cement is helpful in understanding the current uses of concrete.
C. The making of quality concrete begins with the proper relationship of cement, water, aggregates and additives needed to suit all weather conditions and special uses.
D. Ready-mixed and job-mixed concrete quality can be determined by standard tests.
E. The proper estimating of concrete needs is necessary for economical concrete construction.
F. When proper equipment is combined with quality concrete and recommended placement, finishing, and curing techniques are followed, a desirable outcome can be expected.
G. Concrete masonry is widely used in the construction of buildings.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.
B. Historical background of the Portland cement and concrete industries.
C. Basic information about concrete
   1. Cement, water, and aggregates.
   2. Mixing procedures
   3. Additives
      a. Air entrainment agents
      b. Calcium chloride
      c. Others
   4. Standard quality tests
D. Uses of concrete
   1. General agricultural uses
   2. Special uses
E. Concrete estimating
   1. Ready-mixed concrete
   2. Job-mixed concrete
F. Placing and finishing concrete
   1. Tools needed
   2. Forming
   3. Reinforcement
   4. Finishing and curing procedures
G. Concrete masonry construction
   1. Mortar mixes
   2. Block placement
   3. Special reinforcement
   4. Joint finishing

IV. Motivation

A. Field trips to a ready-mix plant and a construction site
B. Films and filmstrips on the concrete industry
C. Bulletin board displays

V. Learning Activities

A. Occupational experience program
B. Calculate the amount of cement and aggregates needed for a concrete driveway.
C. Laboratory exercise to include mixing, quality testing, placing, finishing, and curing of concrete.
D. Special projects — school or home.

VI. Materials Needed

A. Books
1. Phipps. *Mechanics in Agriculture.* Interstate. 1967.
2. Schmidt, Lewis & Olin. *Construction: Principles, Materials, and Methods.* Interstate. 1970.

B. Pamphlets
1. "Use of Concrete on the Farm," Bulletin 2203. USDA, Washington, D.C.
2. Available from Portland Cement Association, 33 West Grand Avenue, Chicago, Illinois 60610: "Concrete Improvements Around the Home," "Concrete for Agriculture," "Foundations for Farm Structures," "Making Good Concrete," "Building With Concrete Masonry," "Building Better Farm Homes With Concrete," "Modern Plans for Modern Farms," and "Concrete Improvements for Farm and Ranch."

C. Films
1. "Better Dummy Joints." U.S. Army Engineer District. Little Rock, Arkansaw.
2. "Concept in Concrete." Ideal Cement, Public Relations Dept. 821 17th Street, Denver, Colorado 80202.
3. "Futures in Concrete." Ideal Cement
4. "New Dimension in Concrete." Ideal Cement.

CONSERVATION

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in conservation and will be able to relate these factors to his/her own specific needs and aspirations.

B. Describe the role of agriculture in conservation.

C. Compare the natural and agricultural systems.

D. List the methods necessary to maintain artificial systems.

E. Relate the "use, not abuse" philosophy to natural resources.

F. Analyze agriculture's contribution to environmental problems and prepare one solution for each problem.

G. Explain orally why farmers should be concerned with their pollution problems.

II. Concepts to Develop

A. There are career opportunities in conservation for young men and women at all levels of educational preparation.

B. Agriculture is a part of the total environmental system.

C. Agriculture plays a part in environmental destruction.

D. Agriculture is an artificial system and thus must rely on artificial supports.

E. Farmers need to be concerned about environmental pollution.

F. Agriculture contributes to our resource problem of siltation and fertility.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Agriculture is an unbalanced and artificial system
1. Natural vs. agricultural system.
   a. Natural system.
      1) Many different plants and animals.
      2) Great variety — mixture in a given area.
      3) Natural enemies of each plant and/or animals are present.
      4) Stronger living organisms (weeds can stand drought much better than corn).
   b. Agricultural system (corn field or field lot).
      1) Only one or two types of living organisms present.
      2) Very little variety — all the same (thus, all have similar weaknesses).
      3) Few natural enemies of pests are present (we spray with pesiticides thus eliminating "good" and "bad" insects).
      4) Weaker organisms subject to many more diseases.
      5) Agricultural system is based on economics, thus we must

have maximum production in a given space or animal — not true in a natural system.

2. Methods used to maintain the artificial unbalanced agricultural system.
   a. Tillage.
   b. Pesticides.
   c. New varieties.
   d. Fertilizers due to the economic nature of agriculture and the demand for food.

C. Philosophy of agriculture towards the environment
   1. Over-reaction: Many agriculturists have over-reacted to criticism of farming methods.
   2. Use-not-abuse: Agriculturists need to develop the philosophy of using properly the natural resources at their disposal and not abusing them. Is a farmer who drains a marsh to increase and feed grain payments actually using his natural resources — or is he abusing them?

D. Agricultural contributions to environmental problems
   1. Land runoff.
      a. Siltation.
      b. Fertility.
      c. Pesticides.
      d. Soil destruction.
      e. Some solutions.
         1) Proper soil and water conservation practices.
         2) Keep class V and VIII land in vegetative cover.
         3) Maintain 20 feet of "filter cover" (grasses) between fields and streams.
         4) Use proper amounts of fertilizers and pesticides.
   2. Feedlot (barnyard) runoff.
      a. Can cause many problems, (*i.e.*, fertilize lakes and streams).
      b. May contaminate water with disease organisms which can become a public health problem.
      c. Some solutions.
         1) Construct proper holding areas until manure can be put on the land (recycle).
         2) Fence animals from stream if near to barnyard.
         3) Maintain a "cover filter" if barnyards are near stream or lake.
         4) Relocate yards if practical.
         5) Put more thought into location of feed lots before construction.
   3. Ground water pollution.
      a. Contamination of wells.
      b. Normally a problem with high concentration of cattle possible from high nitrogen applications to soil but not proven yet.
      c. Is often a problem where subsoil is underlain by limestone — which does not filter ground water.
      d. Some solutions.
         1) Regular removal of manure.
         2) Concrete or pave areas of high manure concentration.
         3) Proper location of feed lots before construction.
         4) Storage of manure in water tight structures.
   4. Pesticides
      a. May affect non-target wildlife species.
      b. May contaminate water supplies.
      c. May injure farmer during application.
      d. May build up residue in food supply.
      e. You can:
         1) Follow label directions.
         2) Only apply when absolutely necessary.
         3) Dispose of containers properly.
         4) Use proper protective equipment.
         5) Select "single target" chemicals where possible.
         6) Select low residue chemicals where possible.
         7) Select chemicals which break down rapidly whenever possible.
         8) Use — don't abuse.
         9) Proper conservation practices which reduce runoff will reduce pesticide contamination of streams and lakes.
         10) Rotate crops — reduces the need for fertilizers and pesticides.
         11) Increase the use of biological controls or agricultural pests.
   5. Other considerations
      a. Do we really need "clean" fence rows?

b. Do we have to take out every tree that is not in "the woods?"
c. Do we need to drain that pothole?
d. Do we really need to straighten out that stream?
e. Do we really need to use that brush killer?
f. Can we leave that odd corner for nesting cover?
g. Can we plant some trees and shrubs?
h. Can we allow some hunting?
i. Do we really need to fall plow?
j. Are all weeds "bad?"
k. Can we fence that stream to keep the cattle out?

6. Odors, rodents, and other nuisances.
   a. Those farmers who are located near cities, housing developments and urban areas find these problems more important than other pollution problems.
   b. There have been Wisconsin farmers forced to go out of business.
   c. Solutions: removal of manure regularly, not spreading manure near road, proper sanitation, judicious use of rodenticides and insecticides, proper drainage or reduce standing water areas.

IV. Motivation

A. Field trips
B. Resource speakers
   1. DNR Environmental Protection.
   2. Soil Conservation Service.
   3. Game manager.
   4. County planner.
   5. Public health officials.
   6. Zoning enforcement officer.
C. Films, filmstrips and slides.
D. Bulletin board displays.

V. Learning Activities

A. Prepare a list of plant and animal species found in the natural and agricultural system.
B. Prepare a list of the natural enemies of plant and animal species.
C. Collect and display pesticide labels used in the agricultural system.
D. Design a feedlot which includes safegrounds that prevent runoff.
E. Collect and test samples of water to determine its suitability for drinking.
F. Display equipment used to protect a person who handles and applies pesticides.

VI. Materials Needed

A. Books
   1. Dasmann. *Environmental Conservation.* Wiley & Sons, Inc. 1964.
   2. McNall. *Our Natural Resources.* Interstate. 1965.
   3. Parson. *Conserving American Resources.* 2nd Edition. Prentice-Hall. 1964.

B. Bulletins and Pamphlets

The following are available from the University of Wisconsin-Extension, Bulletin Room.

1. "Controlling Waterweeds."
2. Land Use Planning Films." Preliminary Report. Entine.
3. "Understanding a Modern Sewage Treatment Plant."

C. Films

The following are available from BAVI-University of Wisconsin, Madison:

Conservation

"Adventuring in Conservation." 4912.
"Air Pollution," 0678.
"Conservation and Balance in Nature." 6443.
"Conservation in Natural Resources." 0467.
"Conservation: To Save Our Environment." 7813.
"Conserving Our Soil Today." 5079.
"Conserving Our Water Resources Today." 5367.
"Conserving Our Wildlife Today." 1312.
"Cry of the Marsh." 7350.
"Every Drop Fit to Drink." 6141.
"Lakes—Aging and Pollution." 3967.
"Let's Keep America Beautiful." 5787.
"Man's Impact on His Environment." 2996.
"Minerals' Challenge." 7614.
"Problems of Conservation: Minerals." 7624.
"Problems of Conservation: Water." 2376.
"Your Friend the Soil — Keep It or Lose It." 3173.
"Your Friend the Water — Clean or Dirty." 3174.

Conservation — Soil

"Grass Roots in the Soil." 3537
"Problems of Conservation: Soil." 7600

CONSERVATION AND NATURAL RESOURCES

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to conservation and natural resources and relate these factors to his/her own specific needs and aspirations.
B. Develop his/her own personal conservation philosophy.
C. Critique the conservation philosophy of political parties and politicians.
D. Describe the proper methods of conserving natural inexhaustable resources, natural exhaustable resources, both replaceable and irreplaceable, human resources.
E. Classify resources according to the above.
F. Determine proper methods of conserving any resource according to the above.
G. Define conservation.
H. Discuss various uses of a natural resource.
I. Describe five anticipated conflicts to the multiple uses of any local natural resource.
J. Apply the basic principles of conservation to local natural resources.
K. Categorize the aspects of ecology.
L. Describe five reciprocal relationships between a living organism and its environment.
M. Distinguish between a biotic and abiotic environment and to catalog local factors within each group.
N. Visualize specific examples of interspecific and intraspecific environmental factors.
O. Describe the "community concept" and list ten living members of local environments.
P. Diagram the food relationships which might exist in the above.

II. Concepts to Develop

A. There are career opportunities in conservation and natural resources for men and women at all levels of educational preparation.
B. Conservation is the wise use and management of natural resources.
C. Ecology deals with the mutual relations between organisms and their environment.
D. Ecology and conservation are interrelated.
E. An understanding of ecology and conservation is essential to prevent conflicting decisions.
F. Several criteria are used in classifying resources.

III. Subject Matter to Teach

A. Careers
   1. Current employment information.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Developing a conservation philosophy.
   1. Natural resources — provided by nature and useful to man.
      a. Inexhaustable — air, water, soil — may have great aesthetic value (clean lakes and streams, no conservation methods.).
      b. Exhaustable resources — those in limited supply.
         1) Irreplaceable — gas, oil, soil — conservation methods — minimize waste, find substitutes, recycle.
         2) Replaceable resources — clean air, clean water, soil minerals, grasslands — conserving methods — restoration, proper harvest, minimize waste, reduce runoff, forest fires.
   2. Human resources
      a. People — our most important resource — the reason we conserve our resources.
      b. Man-made resources — plastics, and synthetic clothing — conserving effect — provide substitutes for natural materials which may be in low supply and are non-renewable or which may have a higher priority use.

C. Conservation implications
   1. Definition — an act of conserving, to keep in a sound or safe state, preserve from loss, decay, waste, or injury, to keep unimpaired.
   2. Preservation of the rare and unique redwoods, Dells area, whooping crane and ivory-billed woodpecker.

3. Recycling — re-use of our natural resources to reduce total consumption.
4. Management of natural resources — the use, not abuse, of resources with a concern for the future.
5. Sportman's view — better hunting and fishing.
6. Prospect — greatest use for the most people for the longest time.
7. Multiple use — natural resources are to be used in numerous ways. The perceptions of people are determined by the manner in which they expect to use the resource. The use of a lake is viewed differently by a swimmer, fisherman, manager of a factory, farmer, sanitation officials of a city, and a resort owner.

D. Ecology
1. Definition — a field of study concerned with the relationships between the environment and living organisms and between two living organisms.
2. Aspects of ecology — involves a reciprocal relationship between an individual and its environment.
3. a. A pine tree is *affected* by bark beetles, birds, soil, water, bacteria, fungi, worms, sun and wind.
b. A pine tree *affects* wind speeds, temperature, birds, bark beetles, bacteria.
c. Environment
1) Abiotic — non-living, soil water, soil minerals, soil oxygen, wind, humidity, rainfall and sunlight.
2) Biotic — living between two different interspecific species — fox and pheasant, tick and fox, tick and rocky mountain spotted fever, tick and trees, pheasant and berries.
3) Intraspecific — between two individuals of the same species. Male and female, two females, two males (Deer rutting season) in competition for food, nesting cover, and nursery cover.
d. Community approach — a woodlot is a total community of plants, animals and non-living factors which result in some semblance of order and balance.
e. Bio energetic — food relationship
1) Food levels within the comcomunity — producers and consumers — carnivorous, omnivorous, piscivorous, and herbivorous.
2) Animal population — related to excess food produced by plants.
3) Food level efficiency — about 90 percent waste of energy between various food levels.
4) Conserving living natural resources — animal numbers increase when food supply is increased.

E. Other specific areas
1. Pesticides.
2. Pollution — air and water.
3. Forestry.
4. Wildlife.
5. Fish.
6. Soil and water conservation.
7. Scenic and recreational use.
8. Politics and conservation decisions.
9. Economics and conservation decisions.

IV. Motivation
A. Films, slides and filmstrips.
B. Charts.
C. Bulletin board displays.
D. Resource persons speak to class members.
E. Field trips to a bog, marsh, prairie, forest, clean water source, polluted lake or stream, feed lots, recycling operations, city land fill, game farm, fish farm preserves and refuges.

V. Learning Activities
A. Develop charts of food levels in communities visited.
B. Develop a list of priorities for resources in the area.
C. Develop a plan for local pollution problems.
D. Lay out a camp ground.
E. Develop an environmental impact statement for a local building project.
F. Present reports to class or employment opportunities.
G. Occupational experiences in all phases of conservation.

VI. Materials Needed
A. Books
1. Dasmann. *Environmental Conservation.* Wiley & Sons, Inc. 1964
2. McNall. *Our Natural Resources.* Interstate. 1965.

3. Parson. *Conserving American Resources.* 2nd Edition. Prentice-Hall. 1964.

B. Films

The following are available from BAVI — University of Wisconsin, Madison:

Natural Resources
"Apostle Island Region." 7521
"Eternal Forest." 7580
"Nature Is For People." 7256
"One Big Ocean and Why It Is Important To You." 7695
"Our National Resources." 4635
"Our Productive Land." 4636
"Problems of Conservation: Minerals." 7624
"Problems of Conservation: Water." 2376

Conservation
"Adventuring in Conservation." 4912
"Air Pollution." 0678
"Conservation of Natural Resources." 0467
"Conserving Our Forests Today." 5079
"Conserving Our Water Resources Today." 5367
"Conserving Our Wildlife Today." 1312
"Dust Bowl." 6030
"Grassland Ecology: Habitats and Change." 3966
"Inland Lake Demonstration Project." 7773
"Lakes, Aging and Pollution." 3967
"Nature in the City." 7832
"No Deposit — No Return." 4308
"Patterns of the Wild." 6363
"Poisoned Air." 6576 - 6577
"Problems of Conservation — Forest and Range." 7904
"Redwood Trees." 5449
"Survival in the Animal World." 3974
"Survival of the Prairie." 7361 - 7362
"Tomorrow's World: Feeding the Billions." 7561 - 7562
"Water Pollution." 7875
"Wealth of the Wasteland." 1370
"What Are We Doing to Our World?" 7251 - 7252
"What's Happening to Our Lakeshores?" 6536
"What's Happening to Our Landscape?" 6366
"Who Killed Lake Erie?" 4524
"Wildflowers of Upper Midwest: Prairie." 6841
"Wildflowers of Upper Midwest: Wetlands." 6840
"Wildflowers of Upper Midwest: Woodlands." 6839

Conservation — Soil
"Birds and Nests." 6778
"Grass Roots in the Soil." 3537
"Man Uses and Changes the Land." 6889

Ecology
"Animals That Live in the Water." 7769
"Beaver Valley." 2241
"Conservation and Balance in Nature." 6443
"Conservation to Save Our Environment." 7813
"Cry of the Marsh." 7350
"Life in a Pond." (Revised), 7782
"Life in the Grasslands." 3255
"Our Land Needs Your Help." 7658
"Plant-Animal Communities: Ecological Succession." 7052
"Pollution Is a Matter of Choice." 7437
"Recycling." 3979
"Soil Makers." 7085
"Stuff We Throw Away." 7923
"What Are We Doing To Our World?" 7551 - 7552
"What Ecologists Do." 3968

COOPERATIVES

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in cooperatives and will be able to relate these factors to his/her own specific needs and aspirations.

B. Contrast the four methods of doing business under the free enterprise system.

C. Define the term cooperative.

D. Discuss past and present examples of cooperative activity.

E. Discuss the extent of cooperative activity in today's business world.

F. Explain three basic principles that make a cooperative different from all other types of business.

G. Comprehend the philosophy that each member has one vote in a cooperative.

H. Explain the reasons why people invest money in the individual proprietorship, partnership, corporation and cooperative.
I. Describe how earnings resulting from business activity are distributed.
J. Outline the tax responsibilities of cooperatives.
K. Compare the different types of farmer cooperatives.
L. List and discuss some of the reasons why farmers have organized cooperatives.
M. Relate how cooperation affects our daily lives at home, work and at school.
N. List and discuss what farm supplies can be purchased through cooperatives, what products can be marketed through cooperatives and what services are available from cooperatives or mutual enterprises.
O. Discuss the volume of business and total membership of farmer cooperatives in the state.
P. Explain how a farmer cooperative is controlled.
Q. Understand how the chain of ownership operates from farmer members to local, regional and national cooperatives.
R. Distinquish between a centralized and a federated type of cooperative.
S. List and discuss the responsibilities of the board of directors.
T. Explain how cooperatives are financed.
U. Comprehend how savings or earnings are distributed to patrons.
V. Discuss how farmer cooperatives are taxed by the government.
X. Explain how a share of voting stock can be earned.
Y. Describe the election process of the officials of a cooperative.
Z. Discuss the duties of a manager and the board of directors.
AA. List and discuss the reasons why some farmer cooperatives have failed.
BB. Explain the principal factors which contribute to the success in a farmer cooperative.
CC. Describe the chain of ownership in a farmer cooperative.
DD. Distinguish between dividends and patronage refunds.

II. Concepts to Develop

A. There are career opportunities in cooperatives for young men and women at all levels of educational preparation.
B. A cooperative is people organized for business purposes to serve themselves.
C. Cooperatives pay all types of taxes.
D. A cooperative is essentially an organization of people working together.
E. A cooperative is one of four ways that private enterprise organizes to do business in America.
F. The net earnings of a cooperative are returned to the patrons or users in proportion to business done with the cooperative.
G. When people use the services of a cooperative, they help themselves and their fellow members.
H. The legal ownership of a cooperative is vested in its members.
I. Only a small portion of the business done in the United States is the result of cooperative activity.
J. Farmers join and patronize a cooperative primarily to help themselves make more money.
K. One of the distinguishing characteristics of a cooperative is democratic control.
L. The responsibility for being informed about the financial structure and services available rests with each member.
M. Cooperatives need loyal members.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.
B. Historical background
   1. Informal cooperative activities of the pioneers.
   2. Persons involved in the cooperative movement.
   3. Principles identified of the Rochdale pioneers.
   4. Cooperative activity in the United States.
   5. Cooperative activity in Wisconsin.
   6. Origin and extent of cooperative activity at the local and county level.
C. Business organizations in the free enterprise system
   1. Methods used for providing goods and services to people.
   2. Principles that distinguish a cooperative form from other types of businesses.

3. Examples of business organizations found in the community and reasons for establishing these businesses.
4. Reasons for investing money in the various types of businesses.
5. Rationale for organizing a cooperative.

D. Organization of the cooperative
1. Different types of farmer cooperatives.
2. Purpose of each type of cooperative.
3. Procedure to use in organizing the cooperative.
4. Benefits to the community resulting from each type of cooperative.
5. Scope and volume of business of each type of cooperative.

E. Extent of cooperative business activity
1. Principal activities carried on by farmers through their cooperatives.
2. Total dollar volume resulting from cooperative activity.
3. Number of farmer cooperatives in the state. In the nation.
4. Our state's rank in the volume of business and number of members.

F. Cooperative governing structure
1. How cooperatives are controlled.
2. How farmer cooperatives are operated.
3. Chain of ownership and control from farmer members to local, regional and national cooperatives.
4. Comparison of a centralized and a federated type of cooperative.
5. Responsibilities of the board of directors - when and how elected.
6. Responsibilities of the officers of a cooperative, when and how elected.
7. Selection of a manager and employees.
8. Reasons why some cooperatives have failed.

G. Financing cooperatives
1. Define revolving capital.
2. Types of stock.
3. Certificates of indebtedness.
4. Banks for cooperatives.
5. Commercial banks.
6. Other sources.
7. Payment of dividends.
8. Taxes paid by cooperatives.

IV. Motivation

A. Films, filmstrips and slides.
B. Bulletin board displays.
C. Field trips to local cooperatives.
D. Class presentation by a cooperative manager, members of the board of directors or members.
E. Charts
F. Arrange for a tour to a large regional cooperative with special emphasis on career in cooperatives.

V. Learning Activities

A. Occupational experience in a local cooperative business.
B. Compile a list of cooperatives found in the community and classify each as a service, marketing, purchasing or supply business.
C. Compile a list of career opportunities that can be found in cooperatives, in agriculture, insurance, finance, health care, housing, consumer goods, and services, and other fields.
D. Compile a list of types of services performed by cooperatives such as marketing dairy products, grain, selling farm supplies.
E. Have students present a short skit portraying an annual cooperative meeting including the use of correct parliamentary procedure.
F. Students write up and present a report to the class on a youth camp or conferences they have attended.
G. Interview a manager of a cooperative, a manager of a corporation, a member of a parternership, and an owner of an individually owned business to find out how these businesses operate.

VI. Materials Needed

A. Books, Booklets
1. *Careers in Cooperatives*, Cooperative League.
2. *Cooperative Growth, Trends, Comparisons, and Strategies.* Farmer Cooperative Service, U. S. Dept. of Agriculture, Room 1474, South Building, Washington, D. C. 20250.
3. *Cooperatives in Our Private Enterprise System.* American Institute of Cooperation, 1200 17th St., Washington D. C. 20036.
4. *Cooperatives, Principles and Practices*, A1457, Schaars. University of Wisconsin — Extension.
5. *Foreign Trade*, Farmer Cooperative Service.
6. *Four Methods of Doing Business*, FELCO, Fort Dodge, Iowa.

7. *How We Organize to do Business in America*, The Cooperative League.
8. *Taxes — Cooperatives Have Them Too*, The Cooperative League.
9. *Teaching Outline in Cooperatives*, The Cooperative League.
10. *You're Off — The Farm Business*, Cooperative League.

B. Films

1. "An A For The BC Way." — Farm Credit Administration, Washington, D.C.
2. "As Consumers We're Owners." — Midland Cooperatives, Inc., 739 Johnson Street, N.E., Minneapolis, Minn. 55413.
3. "Credit Where Credit Is Due." — Farm Credit Administration.
4. "Economics of Democracy." — Midland Cooperatives.
5. "Help Yourself To Ownership." — Midland Cooperatives.
6. "Men of Rochdale." — The Cooperative League of the USA, 59 E. Van Buren Street, Chicago, Illinois 60605.
7. "Strawberries — With Cream." — The Cooperative League of the USA.
8. "The REA Story." — Farmer Cooperative Service.
9. "This Business Called a Co-op." Farmers Union Central Exchange, P.O. Box G, St. Paul, Minnesota 55075.
10. "This Is A Cooperative." — The Cooperative League of the USA.
11. "Where People Count." — Midland Cooperatives.

CORN PRODUCTION

I. Performance Objectives

Upon completion of this unit the students will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the corn industry and will be able to relate these factors to his/her own specific needs and aspirations.
B. Identify the different types of corn.
C. Locate on a map the corn growing areas in the county, state and nation.
D. Select seed adapted to his growing area.
E. Contrast different methods of hybrid seed corn production.
F. Develop a fertilization plan for corn production on the home farm.
G. Develop a plan for the use of herbicides, insecticides and fungicides for the home farm.
H. Discuss the different methods of harvesting and storage.
I. Select cultural practices needed for a successful corn crop.
J. Explain the marketing channels available to producers.

II. Concepts to Develop

A. There are career opportunities in corn production for young men and women at all levels of educational preparation.
B. Corn is the most valuable crop grown in the United States.
C. Corn is used in a multiple of ways including feed for livestock, for human food and for commercial uses.
D. Hybrid corn represents the most important single advance in corn production since it has been grown by people.
E. Several methods are utilized in the production of hybrid corn.
F. A successful corn crop is the result of carefully followed approved practices and judicious management.
G. Corn is marketed in several ways.
H. Climate conditions and soil fertility are more important in growing corn than in growing any of the important cereals.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.
B. Introduction to corn
   1. Kinds of corn.
   2. Uses of corn.
   3. Growing areas.
      a. National
      b. State
      c. County
   4. Amount of corn grown.

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5. Climatic and soil requirements.
6. Corn growth and development.
7. International implications, distribution and trade.

C. Seed corn selection
1. Hybrid production.
   a. Systems.
   b. Relative maturities.
   c. Variety selection.
      1) Silo corn and crib corn.
      2) Commercial production.

D. Corn culture
1. Methods of seed bed preparation.
2. Fertilization.
3. Planting.
4. Weed control.
   a. Chemical.
   b. Cultivation.
5. Insect control.
6. Disease control.
7. Harvesting.
   a. Silage.
      1) How fine to chop.
      2) How to preserve.
      3) What happens in the silo.
      4) Use of corn silage additives.
   b. Grain.
8. Storage methods.

E. Marketing
1. Local markets.
2. International markets.

IV. Motivation

A. Field trips to area corn plots.
B. Field trip to corn drying and storage systems.
C. Bulletin board display.
D. Films, slides and filmstrips on corn production.
E. Field trips to successful corn growers.
F. Attend field days and farm progress days.
G. Field trip to research farm.

V. Learning Activities

A. Occupational experience programs.
B. Design a corn program for the home farm.
C. Collect samples of various types of corn.
D. Run moisture tests on corn.
E. Perform a yield check on corn.
F. Participate in a local department corn yield contest.
G. Weed control plots.
H. Fertilizer test plots.
I. Plots utilizing different row spacing and plant populations.

VI. Materials Needed

A. Books
1. Aldrich. *Modern Corn Production.* A & L Publications. 1965.
2. Brickbauer. *Approved Practices in Crop Production. Interstate.* 1967.
3. Brickbauer, Berge, Fisher, Nelson, Vilstrup, Weigle, Worf. *Grain Marketing in Wisconsin.* College of Agricultural and Life Sciences, University of Wisconsin - Madison.
4. Delorit & Ahlgren. *Crop Production.* Prentice-Hall. 1967.
5. Thompson & Troeh. *Soils and Fertility.* McGraw-Hill. 1957.

B. Bulletins and Pamphlets
1. "Corn." Circular 548, University of Wisconsin - Extension.
2. "Corn Culture." Circular 549, University of Wisconsin - Extension.
3. "Corn Diseases." Agricultural Handbook 199, U. S. D. A., Washington, D. C.
4. "Corn From Bag to Bin." Circular 605 University of Wisconsin - Extension.
5. "Corn Silage for Wisconsin Cattle." A1178, University of Wisconsin - Extension.
6. "Diseases of Corn in the Midwest." Publication 21, North Central Regional Extension.
7. "Drying Shelled Corn and Small Grains." FB2214, U. S. D. A.
8. "The European Corn Borer." FB-2190, U. S. D. A.
9. "Southern Corn Leaf Blight in Wisconsin." Circular 674, University of Wisconsin - Extension.
10. "1973 Wisconsin Agricultural Statistics." Wisconsin Dept. of Agriculture.
11. "Wisconsin Corn Hybrids." Bulletin 476, University of Wisconsin - Extension.
12. "Wisconsin Corn Hybrids." Circular 675, University of Wisconsin - Extension.

C. Films and Filmstrips
1. The following movies from BAVI - University of Wisconsin:
   a. "Corn." 2722
   b. "Corn Farmer." 5854
   c. "Corn From Bag to Bin." 5818
   d. "Let's Look at Weeds." 3138
   e. "Modern Row Crop Planter." 6989
   f. "Seeds of Plenty." 7696

DAIRY CATTLE MANAGEMENT

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in dairy cattle management and will be able to relate these factors to his/her own specific needs and aspirations.
B. Discuss the various dairy breeds and their characteristics.
C. Evaluate and select breeding stock.
D. List and discuss the labor, feed, and housing requirements of the dairy enterprise.
E. Develop an understanding of dairy cattle breeding systems and genetics.
F. Formulate herd health programs for the prevention of dairy cattle diseases.
G. Discuss the various diseases of dairy cattle.
H. List the steps and procedures for producing high quality milk.
I. Understand the methods used in improving farm animals through breeding.
J. List and discuss how dairy products are produced.
K. Compare milk grades, marketing orders, and price blends.
L. Describe a good program for raising dairy calves that is practical, economical and feasible for the growth and development of good herd replacements.
M. Evaluate goals of dairymen in improving breeding efficiency.
N. Comprehend the reproductive system of farm animals.
O. Discuss the advantages of dairy herd testing.
P. Compare the methods used to determine the butterfat content of milk.

II. Concepts to Develop

A. There are career opportunities in the dairy industry for young men and women at all levels of educational preparation.
B. Artificial insemination has had a significant impact on the type and production of dairy cattle in recent years.
C. Correct evaluation of the dairy cow's characteristics is essential before selecting a sire for mating.
D. All dairy cows should be fed *for* production.
E. Successful dairymen raise most of their herd replacement.
F. A positive relationship exists between quality of dairy products and their rate of consumption.
G. An effective culling program is dependent on the availability and correct interpretation of the records of each cow.
H. Knowledge of desirable characteristics is essential when selecting replacements for the home dairy herd.
I. Several methods of marketing milk and other dairy products are available.
J. Hormones play a vital role in milk secretion and "letdown."
K. The lack of proper disease and insect control measures result in lower production levels.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4 Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.
B. Breeds of dairy cattle
   1. The Holstein.
   2. The Guernsey.
   3. The Jersey.
   4. The Brown Swiss.
   5. The Ayrshire
   6. Reseach in development of new breeds.
C. Selection and breeding of dairy cattle
   1. Selection of foundation stock.
   2. Breeding dairy cattle.
D. Dairy cattle judging and evaluating type
   1. Requires a knowledge and interest in dairy cattle.
   2. Breed associations identify qualifications and disqualifications in registering purebred cattle.
   3. Parts on a dairy cow classification score card.
   4. Identifying dairy terms for general appearance, dairy character, body capacity, and mammary system.
   5. Establishment of type standards.
   6. Correlation between type and production.
   7. Methods of evaluating type.
      a. Breed classification programs.
      b. Competing in the show ring.

c. Learning type appraisal.
8. Dairy judging contest.

E. Feeding dairy cattle
1. The feeds for dairy cattle.
2. The nutritive content of common dairy cattle feeds.
3. The digestive system of dairy cattle.
4. Nutritive requirements.
5. Daily rations for different breeds and age groups.
6. The use of forage, silage, and pasture.
7. The use of protein supplements.
8. Formulating rations (Pearson Square).

F. Raising replacement dairy stock
1. Care of the dry cow.
2. Important early feeding of calf.
3. Feeding following the colostrum period.
4. Feeding schedules.
5. Dry feeding requirements.
6. Loss of calves.
7. Calf management practices.
8. Heifer feeding program.

G. Reproduction in dairy cattle
1. Reproductive physiology of the female.
a. Anatomy of the reproductive tract.
b. The estrus cycle.
2. Reproductive physiology of the male.
a. Anatomy of the reproductive tract.
b. Semen production.
3. Abnormalities of reproduction causing decreased fertility or sterility.
a. Structural defects.
b. Physiological abnormalities.
4. Diseases affecting reproduction.
a. Brucellosis.
b. Vibriosis.
c. Trichomoniasis.
d. Leptospirosis.
e. Non-specific infections.
5. Nutrition and reproduction.
6. Inheritance of fertility.
7. Managing dairy cattle for high fertility.
8. Optimum age for beginning reproduction.
a. Detecting heat in cattle.
b. The period of gestation.
c. Adequate care at calving.
d. Feeding at calving time.
e. Milking at calving.
f. Udder edema.
9. Management of reproduction in male.
a. Effect of feed on reproductive performance.
b. Rate of usage.
c. Housing for bulls.
10. Summary of procedures for improving breeding efficiency.

H. Artificial insemination — sire selection
1. Past history of artificial insemination.
2. Collecting and processing semen.
a. Frequency of collection
b. Evaluation of semen.
c. Semen diluters.
3. Frozen semen.
4. Inseminating the cow.
5. Artificial breeding organizations.
6. Records in artificial insemination.
7. Inbreeding and outbreeding.
8. Advantages of artificial breeding.
9. Principals of selection.

I. Milk secretion — proper milking procedures
1. Composition of milk.
2. Structure of udder.
3. Circulatory system of udder.
4. Milk "letdown" mechanism (hormones).
5. Rapid milking rate.
6. Adjusting individual milking machines.
7. Milking procedure.
8. Factors affecting milk output.
9. Producing high quality milk.

J. Milk testing
1. Babock method.
a. Procedure.
b. Use of test.
2. Schain test.
3. DPS test.
4. Milk o-tester.
5. Solids — non fat.
6. Test Interval Method (TIM).

K. The use of dairy management records
1. The Dairy Herd Improvement Association (D.H.I.A.).
a. Owner sample records.
b. Use and interpretation of standard D.H.I.A. records.
c. Test Interval Method (TIM).
2. The cost of record keeping and choosing a record system.
3. Milk production or butterfat.
4. Herd health records.

L. Disease and parasites of dairy cattle
1. Diseases and ailments of dairy cattle.
2. Poisonous chemicals and plants.
3. Disease prevention and treatment.
4. Parasites of dairy cattle—external and internal.
5. Normal temperature and breathing rate.

6. Equipment needed for treatment.

M. Dairy cattle housing
   1. Housing requirement regulations.
   2. Selection of type and size of dairy housing.
   3. Selection of proper silo and arrangement of dairy buildings and equipment.
   4. Health and comfort of animals.
   5. Milking facilities.
   6. Milk house.
   7. Storage of feed and bedding.

N. Marketing dairy cattle, milk and dairy products
   1. Marketing grade and purebred dairy cattle.
      a. Replacement heifers.
      b. Springing heifers.
      c. Milking cows.
      d. Cull cows.
   2. Federal orders.
   3. Milk grades.
   4. Milk classes.
   5. Blend price.

IV. Motivation

A. Field trips to outstanding area herds.
B. Attend dairy shows.
C. Bulletin board displays.
D. Up-to-date instructional media on dairy production.
E. Field trips to agribusinesses associated with the dairy industry.
F. Field trips for selection of breeding stock.
G. Films, filmstrips and slides.

V. Learning Activities

A. Occupational experience on area farms.
B. Participate in judging activities.
C. Dehorn calves, treat animals for lice, clip cow's udder and flanks, dip calf's navel in iodine.
D. Fit animals for dairy shows.
E. Exhibit animals at dairy shows.
F. Perform methylene blue test.
G. Perform several mastitis tests.
H. Perform several tests to determine butterfat content.

VI. Materials Needed

A. Books
   1. Beeson. *Livestock Judging and Evaluation.* Interstate. 1970.
   2. Bundy & Diggins. *Dairy Production.* Prentice-Hall. 1967.
   3. Bundy & Diggins. *Livestock and Poultry Production.* Prentice-Hall. 1966.
   4. Cole. *Introduction to Livestock Production.* W. H. Freeman and Co., 1962.
   5. Coletti. *Handbook for Dairymen.* Iowa State University. 1963.
   6. Davis. *Modern Dairy Cattle Management.* Prentice-Hall. 1962.
   7. Ensminger. *Dairy Cattle Science.* Interstate.
   8. Knodt. *Successful Dairying.* McGraw-Hill. 1954.
   9. Moore. *Developing a Profitable Dairy Herd.* Windsor Press.
   10. Morrison. *Feeds and Feeding.* Abridged. Interstate. 1961.
   11. Mortenson & Juergenson. *Approved Practices in Dairying.* Interstate. 1972.
   12. Petersen. *Dairy Science, Its Principles and Practices.* J. B. Lippincott. 1950.
   13. Porter. *Dairy Cattle in American Agriculture.* Iowa State University Press. 1965.
   14. Reaves & Henderson. *Dairy Cattle Feeding and Management.* John Wiley and Sons. 1963.
   15. Salisbury & Van Demark. *Physiology of Reproduction of Cattle.* W. H. Freeman and Co.
   16. Wing. *Dairy Cattle Management.* Reinhold Publishing Corp., New York. 1963.

B. Bulletins and pamphlets
   1. "Animal Nutrition Handbook." Ralston Purina Company, St. Louis, Missouri.
   2. "Dairy Cattle Sterility." Hafs and Boyd, Hoard's Dairyman.
   3. "Dairy Herd Improvement Progress Report." University of Wisconsin - Extension. (A2367).
   4. "Disposition of Calves in Wisconsin." Wisconsin Statistical Reporting Service, Madison.
   5. "Guidelines for Analyzing the Dairy Farm Business." University of Wisconsin Extension.
   6. "Planning for Dairy Farm Expansion." University of Wisconsin Extension.
   7. "Prevent Adulteration of Milk." University of Wisconsin Extension.
   8. "Sampling Milk for D.H.I.A. Tests," University of Wisconsin Extension.
   9. Sire Directories from all A. I. organizations.
   10. "Using the DHI Grain Feeding Guide." University of Wisconsin Extension.

11. "Weighing and Sampling Devices for Pipeline Milking Systems." University of Wisconsin Extension. (A2155).
12. "What You Can Do About Bovine Mastitis." U. S. Dept. of Agriculture, Washington, D. C. (FB2253A).
13. "Wisconsin Farm Enterprise Budgets — Dairy Cows and Replacements." Univerity of Wisconsin Extension.
14. "Wisconsin U. S. D. A. Sire Report." University of Wisconsin-Extension. A2235.

C. Films and filmstrips
1. "Barns for Better Dairying," United States Steel, Chicago Film Distribution Center, 208 South LaSalle Street, Chicago, Illinois.
2. "Breakthrough on Calf Scours Control." John Deere Film Library.
3. "The Cow's Udder and How It Functions." Vocational Agriculture Service, Urbana, Illinois.
4. "Fitting and Showing FFA Dairy." California State Polytechnic College, San Luis Obispo, California.
5. "From Cow to Carton." Modern Talking Picture Service, 1696 N. Aster Street, Milwaukee, WI.
6. "Garget." Babson Brothers Dairy Research Service, 2100 South York Road, Oak Brook, Illinois.
7. "Grow Your Own Dairy." Venard Films, Peoria, Illinois.
8. "The Loose Housing of Dairy Cattle." United States Steel.
9. "Mastisis is Your Problem." Babson Brothers, 2100 South York Road, Oak Brook, Illinois.
10. "Pre-natal Development of the Calf." California State Polytechnic College, San Luis Obispo, Calif. 93401.
11. "Pointers for Judging Registered Holsteins." Holstein-Fresian Association, Battleboro, Vermont. (Slide series).
12. "Raising Dairy Calves." Colonial Films, Atlanta, Georgia.
13. "Rumen Story." Ralston Purina Company.
14. "Science of Profitable Dairying." Ralston Purina Company.
15. "Sterility . . . A Multimillion Dollar Loss to Dairymen." Tri-State Breeders Co-op, Westby, WI.
16. "The Story of Vacuum." Babson Brothers.
17. "The Surge Sanitation Story" Babson Brothers.

D. Laboratory manuals
1. *Adult Farmer Course List.* (Revised 9-1-73), Adult Agricultural Program on Animal Husbandry, Area Vocational, Technical and Adult Education District No. 4, Daniel W. Scheid, Chairman, Agriculture Division.
2. American Breeders Service, Inc. *AI Management Manual.* DeForest, WI 1971.
3. *Dairy Herd Improvement Handbook,* published by WI Junior Dairymen's Association. Oconto Falls, WI.
4. *Dairy Production Guide.* Land O' Lakes Felco Division, Fort Dodge, Iowa, 3rd edition.
5. *Judging Registered Holsteins.* Holstein-Friesian Association of America, Battleboro, Vermont.
6. *The Way Cows Will be Milked on Your Dairy Tomorrow.* 7th edition. Babson Brothers Dairy Research Service, 2100 South York Road, Oak Brook, Illinois (1970).

E. *Periodicals*
1. *Brown Swiss Bulletin*
2. *Dairy Express*
3. *Dairyman's Digest*
4. *Hoard's Dairyman*
5. *Holstein-Friesian World*
6. *Land O' Lakes Mirror*
7. *Milking Shorthorn Journal*
8. *Wisconsin Dairy Facts*
9. *Wisconsin Guernsey's*
10. *Wisconsin Holstein News*

DAIRY PRODUCT MANUFACTURING

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in dairy product manufacturing and will be able to relate these factors to his/her own specific needs and aspirations.

B. Locate the major dairy producing and manufacturing areas of Wisconsin and the United States.

C. Identify the leading counties, states and

nations in the production of milk and dairy products.

D. Discuss, orally or in writing, the importance of dairying to his/her area.
E. Explain, orally or in writing, several factors affecting the composition of cow's milk.
F. List the major constituents of milk and discuss the significance of each constituent to the total composition of milk.
G. Discuss the correct percentages of the constituents of cow's milk.
H. Identify off-flavors in milk.
I. Describe variations in the color of milk and give reasons for this variation.
J. Perform laboratory tests to determine the physical properties of a given sample of milk.
K. Compare the common dairy processes involved in the handling of fluid milk, the purpose of each process, and how it relates to the total handling of the milk.
L. Discuss, orally or in writing, the importance of dairy products to the national, state and local economy.
M. Group the products according to a standard classification form.
N. Explain the fundamentals involved in the manufacturing of dairy products.
O. Evaluate a sample of a manufactured dairy product using a standard scorecard.
P. Describe the several marketing methods associated with dairy products and the economic effects of supply and demand.
Q. Relate the long-term trend in the consumption of each product, the number of plants manufacturing that product, and the proportion of the milk supply being used for manufacturing.
R. Discuss some possible problems involved with the disposal of waste products.
S. List and discuss a minimum of ten occupations in the dairy manufacturing industry.
T. Explain the curriculum available at one of the technical institutes or universities offering a course in dairy-related occupations.

II. Concepts to Develop

A. There are career opportunities in the dairy product manufacturing industry for young men and women at all levels of educational preparation.
B. Breed differences influence the composition and nutritive value of milk.
C. Quality control is essential throughout the process of handling and manufacturing of dairy products.
D. Each manufactured dairy product is the result of a unique process.
E. Grading dairy products is an essential link in the marketing chain.
F. The dairy industry makes a significant contribution to the economy and to the nutritional needs of our people.
G. Many processes are involved in the handling and manufacturing of dairy products.
H. Progress has been made in solving waste disposal problems.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.
B. Survey of the dairy industry
   1. Location of major dairy producing and manufacturing areas.
   2. Importance of dairying locally.
C. Physical properties of milk
   1. Off-flavors and color variations.
   2. Laboratory tests for determination of quality.
D. Composition and nutritive value of milk
   1. Major constituents of milk and their significance.
   2. Factors affecting the composition of milk.
   3. Percentage of each constituent in milk.
   4. Nutrient value to human needs and diet.
E. General dairy processes
   1. Common dairy processes involved in the handling of fluid milk.
   2. Principles involved in the operation of processing equipment, as well as its proper use, care and maintenance.
   3. Disposal of waste products.
F. Dairy product manufacturing
   (may apply to any one of the dairy products with changes)
   1. Importance of the product to the economy.
   2. Grading of the dairy product.
   3. Fundamentals involved in manufacturing.
   4. Manufacturing the product in the laboratory.

5. Composition of the finished product.
6. Evaluation of the quality of the finished product.
7. Marketing and the effect of supply and demand.
8. Long-term trends in consumption and manufacturing of the product.

F. Dairy Industry Education
1. Post-high school education available.

IV. Motivation

A. Field trips to manufacturing plants
B. Field trips to dairy-testing equipment—manufacturing plant and laboratories.
C. Guest speakers from related fields of the industry.
D. Slide sets, filmstrips, and films on dairy product manufacturing.
E. Pamphlets and displays.
F. Judging contest with possible participation in the state contest.
G. Field trip to a technical institute.

V. Learning Activities

A. Occupational experience program.
B. Graph or map of the milk and dairy producing areas.
C. Chart a comparison of whole milk with manufactured dairy products.
D. Study reports of factors influencing the composition of milk.
E. Laboratory exercises, such as butterfat test, freezing point, viscosity, etc.
F. Judging contest for off-flavors.
G. Disassemble and assemble dairy equipment or mock-ups.
H. Produce a dairy product, such as cheese, in the laboratory. Have it graded when completed.
I. Displays of cheese trays as a means of advertising the product.
J. Collect containers used in the dairy product manufacturing industry.
K. Appropriate tests to discover the students' interests and aptitudes.

VI. Materials Needed

A. Books
1. *Cheese and Fermented Milk Foods.* Kosikowski. Department of Food Science, Cornell University, Ithaca, New York. 1966.
2. *Cheese Monograph Series* — Volumes I to V, Charles Pfizer & Company, 235 East 42nd Street, New York, New York 10017.
3. *Course Outline for Milk Processing Plant Employee,* Agricultural Education, Teaching Materials Center, Texas A & M University, College Station, Texas 77843.
4. *Modern Dairy Products.* Lampert. Chemical Publishing Company, New York, New York.

B. Bulletins and pamphlets
1. "A World of Wisconsin Cheese." Wisconsin Department of Agriculture, 801 Badger Road, Madison, Wisconsin 53713.
2. "Handbook of Lactic Starters," Circular 383*
3. Making Cheddar Cheese From Pasteurized Milk," Bulletin 464*
4. "Standardizing Milk for Cheese Making," Circular 408*

*Available from: Bulletin Mailing Room, College of Agriculture, University of Wisconsin, Madison, Wisconsin 53706

5. Dairy Council Digest, National Dairy Council, 111 North Canal Street, Chicago, Illinois 60606
6. How Americans Use Their Dairy Foods (latest edition), National Dairy Council, 111 North Canal Street, Chicago, Illinois 60606
7. Newer Knowledge of Milk, National Dairy Council,
**8. Cheese Buying Guide for Consumers — Bulletin 17-106
**9. Cheese Varieties — Agricultural Handbook #54
**10. Judging and Scoring Milk — Farmers Bulletin No. 2111

**Available from: Superintendent of Documents, U.S. Government Printing Office, Washington, D. C. 20402.

C. Films and Filmstrips
1. "Cheese and Cheesemaking" — International Film Bureau, 332 South Michigan Avenue, Chicago, Illinois 60604 or
Visual Aids Service, University Extension Division, University of Wisconsin, Madison, Wisconsin 53706
2. "Marketing Grade A Milk", Cooperative Extension Service, University of Wisconsin, Madison, Wisconsin 53706
3. "This Is The Dairy Industry", Modern Talking Picture Service Regional office.

D. Laboratory Manuals
1. *Manual for Milk Plant Operations,* Milk Industry Foundation, 910-17th Street, N.W. Washington, D.C.

E. Periodicals
1. *Dairymen Digest*
2. *Dairy Management*
3. *Doane's Agricultural Report*
4. *Farmer's Digest*
5. *Hoard's Dairyman*
6. *Successful Farming*
7. *The Dairy Plant Fieldman*
8. *Wisconsin Agriculturist*

DAIRY HERD TESTING

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in dairy science and will be able to relate these factors to his/her own specific needs and aspirations.
B. Be familiar with the reasons for testing the dairy herd.
C. Understand methods of keeping dairy production records.
D. Understand how records are computed for uniform and equitable production comparisons.
E. List and discuss ways in which milk tests vary.
F. Prepare and use dairy production records.
G. Analyze yearly herd records.
H. List and discuss ways records aid in types of management decisions.

II. Concepts to Develop

A. There are career opportunities in dairy herd testing and production for young men and women at all levels of educational preparation.
B. Records are tools for herd improvement.
C. Testing procedures are exacting and need to be followed with precision.
D. Records make it possible to compare individual animals and entire herds.
E. Yearly analysis of herd records is a good management practice.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.
B. Why test the dairy herd?
   1. Tools for herd improvement.
   2. Economic importance of a testing program.
C. Mechanics of keeping dairy production records
   1. Methods of testing.
   2. Procedures for collecting milk samples.
   3. Identification of dairy animals.
   4. Record keeping plans.
D. How records are computed
   1. General instructions.
   2. Forms used in hand-computed records.
   3. Forms used in other record plans.
E. Why milk tests vary
F. How to use production records throughout the year
   1. Am I feeding enough?
   2. Which cows should be bred and when to breed?
   3. Sire selection and mating to individual cows.
   4. Which cows should be dried off?
   5. Which cows freshened since last test?
   6. Which cows should be culled?
   7. What provisions are being made for herd replacements?
   8. How can RHA be used to improve herd?
G. Yearly herd analysis
   1. Evaluating herd performance.
   2. Measuring the performance of an individual cow.
   3. Measuring the performance of the herd.
   4. Cow evaluation.
   5. Sire evaluation.
H. Management decisions to consider
   1. Improved feeding practices.
   2. Improved breeding practices.
   3. Herd health.
   4. Milking methods.
   5. Insect control.
   6. Milk quality.
   7. Milk marketing.
   8. Dairy promotion activities.

IV. Motivation

A. Field trip to DHI laboratory.
B. DHI supervisor to speak to students on related topics.
C. Construct testing boxes and cow identification signs.
D. Participate in WJDA program of activities.
E. Show slide series on ARC-DHIA testing programs.
F. Keep bulletin board on milk testing activities.
G. Have regular meetings of all interested students or local JDA.
H. Use outstanding farmers or personnel in the dairy industry to speak on dairying as a dynamic industry.

V. Learning Activities

A. Occupational experience program.
B. Demonstrate correct procedure for milk weighing and sampling.
C. Demonstrate correct procedure for testing milk for butterfat.
D. Work out sample records for individual cows and entire herd on monthly and yearly basis.
E. Check butter fat from different cows and herds to show variations in BF content.
F. Demonstrate simple tests for mastitis.

VI. Materials Needed

A. Books
1. Bundy & Diggins. *Dairy Production.* Prentice Hall. 1961.
2. Ensminger. *Dairy Cattle Science.* Interstate.
3. Juergenson. *Approved Practices in Feeds & Feeding.* Interstate.
4. Morrison. *Feeds & Feeding.* Interstate. 1956.
5. WJDA. *Dairy Herd Improvement Handbook.* (Revised 1973)

B. Bulletins and pamphlets
1. "Dairy Herd Improvement Progress Report," Coop Extension Report.
2. "Did You Know Every Cow is Different?" Dairy Science Dept. U.W.—Madison.
3. "Make Dairying Pay the Record Way," Coop Extension Reports U.W. — Madison.
4. "25 to 1 In Your Favor — The Record Way," ARC. Madison, Wisconsin.
5. "Wisconsin Dairy Facts," WI. Statistical Reporting Service.

C. Films, filmstrips and slide sets
1. "Dairy Farmer" — BAVI.
2. "Dairy Herd Improvement"—BAVI.
3. "Feeding for Milking Profits"—Ralston Purina Company.
4. "Good Milking Pays" — BAVI.

D. Workbooks
1. Pynnonen, A. *Vocational Agriculture — Wkbk. No. 1.* Sheldon Book Co., Sheldon, Wisconsin.

E. Periodicals
1. Monthly *DHIA Newsletter.*

F. Laboratory Supplies
1. NASCO, Fort Atkinson, Wisconsin.
2. Local Dairy Supply Companies.

ELECTRICITY, AGRICULTURAL POWER

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the agricultural power industry and will be able to relate these factors to his/her own specific needs and aspirations.

B. Employ electrical principles and terminology in the laboratory exercises.

C. Apply fundamental skills, procedures and circuitry involved in electrical wiring.

D. Be familiar with electrical safety and electrical codes.

E. Apply electrical maintenance and simple electrical wiring operations.

F. Be familiar with electric motors, controls and applications.

G. Be able to safely disconnect power before working on electrical circuits.

II. Concepts to Develop

A. There are career opportunities in agricultural power for young men and women at all levels of educational preparation.
B. Electricity is hazardous if safety procedures are ignored.
C. The electrical industry is varied and diverse in scope.
D. Electrical principles are followed by workers in this industry.
E. Electrical systems need to be maintained.
F. Guidelines have been developed for motor selection, maintenance and application.
G. Electrical codes are standards for proper procedures.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Significance of electrical power in our lives.
   1. Magnitude of electrical energy produced.
   2. Impact of electrical energy on our lives.

C. Principles of electricity
   1. Electron theory.
   2. Circuits.

D. Electrical terminology
   1. Electrical terms.
   2. Ohms Law.
   3. Energy measurement.

E. Generation, transmission and sale of electrical power
   1. Area generating plants.
   2. Transformers and transmission lines.
   3. Substations and distribution.

F. Farmstead electrical distribution
   1. Distribution lines.
   2. Farm transformers.
   3. Service drops.

G. Planning building circuitry
   1. Capacity.
   2. Code requirements.
   3. Design.

H. Conductors
   1. Wire sizes.
   2. Wire capacities.
   3. Insulation types.

I. Boxes, switches, receptacles, fixtures, appliance identification
   1. Types of boxes.
   2. Switch identification and hook-up.
   3. Receptacle types.
   4. Fixture identification and installation.

J. Electrical installation tools and test equipment
   1. Tool identification and application.
   2. Test lights and meters.

K. Wiring installation procedures
   1. Non-metallic cable.
   2. Armoured cable — wires.
   3. Conduit — wires.
   4. Sheathed cable.
   5. Cutting, splicing connecting wires.

L. Electrical safety
   1. UL label.
   2. Cords.
   3. Proper fuses — breakers, weatherproofing devise.
   4. Service safety.
   5. Grounding procedures.

M. Electrical maintenance
   1. Cords, plugs, connectors.
   2. Switches, receptacles, fixtures.

N. Lighting systems
   1. Equipment operation.
   2. Layout and selection.

O. Electric motors
   1. Principles of operation.
   2. Fractional horse power motors.
   3. Large electric motors.

P. Automatic controls
   1. Switches and switch control circuits.
   2. Relay devises.
   3. Motor control devises.
   4. Automatic sensing devises.

Q. Motor applications
   1. Selection.
   2. Protection.
   3. Drives.

R. Electric fences
   1. Installation and maintenance.

IV. Motivation

A. Field trip to power plant.
B. Student electrical panel boards.
C. Electrical safety demonstration model.
D. Bulletin board displays.
E. Home wiring — repair projects.

V. Learning Activities

A. Occupational experience programs.
B. Safety demonstration on safety exhibits.
C. Student wiring exercises on electrical panels.
D. Contest on wiring materials and wiring skills.
E. Panel board troubleshooting exercises.
F. Electrical automatic controls laboratory.

VI. Materials Needed

A. Books
   1. Mix and Pritchard. *All About House Wiring*. Goodheart-Willcox Company. 1962.
   2. Richter, H.P. *Practical Electrical Wiring*. McGraw-Hill. 1960.

B. Bulletins and pamphlets
   1. "Agricultural Wiring Handbook," Edison Electric Institute and the American Society of Agricultural Engineers.
   2. "Electricity in the Home," Circular 4-H - 154. University of Wisconsin Extension.
   3. "Electric Motors," AAVIM.
   4. "Electric Motors for Agriculture," Edison Electric Institute.
   5. "Electric Motors for the Farm," Edison Electric Institute.
   6. "Electrical Terms, Their Meaning and Use," AAVIM.

7. "Electrical Wiring," Sears Roebuck and Company.
8. "Maintaining the Lighting and Wiring Systems," AAVIM.
9. "Understanding Electricity and Electrical Terms," AAVIM.
10. "Suggestions for Teaching Electrical and Basic Controls Used in Agricultural Production," Edison Electric Institute.

C. Visual Aids — Filmstrips
   1. "How Electric Motors Start and Run." AAVIM. Parts I and II
D. Visual Aids — slides
   1. "Wiring for Your Home." USDA.
E. Periodicals — magazines
   1. *Electricity on the Farm* — Dun-Donnelley Publishing Corporation.
   2. *Farm Electrification* — Edison Electric Institute.

FARM MACHINERY

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment for advancement in farm machinery service and sales and will be able to relate these factors to his/her own specific needs and aspirations.
B. Outline the principles associated with each unit of operation on tillage, planting, and harvesting farm machinery.
C. Recognize the proper method of repair of farm machinery.
D. Select methods of testing the correct operation of farm machinery.
E. Explain a concept of the procedures of adjusting machinery for most efficient use.
F. Formulate plans for and calibrate machines for accuracy of application.
G. Identify and list the trade publications and agencies which relate to farm machinery repair and usage.

II. Concepts to Develop

A. There are career opportunities in farm machinery service and sales for young men and women at all levels of educational preparation.
B. The proper use of tools is a good work habit.
C. Operator's manuals and shop technical manuals are invaluable.
D. Safety of operation of each implement is essential.
E. Each worker needs a positive attitude toward safety, cleanliness, and neatness of work stations.
F. A farm machinery worker must possess information about materials of construction, strength of materials, proper types and use of bearings, pulleys and belts.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunities for advancement.
   6. Other factors relating to student needs and aspirations.
B. History and origin of farm machinery industry
   1. Early development.
   2. Present.
   3. Future trends in development.
C. Employment opportunities in the farm machinery field
   1. Opportunities in maintenance.
      a. Farm operator.
      b. Dealer mechanic.
      c. Manufacturer's representative.
      d. Private business.
   2. Opportunities in sales.
      a. Dealer representative.
      b. Manufacturer representative.
      c. Private business.
D. Types of machinery
   1. Tillage tools.
      a. Primary.
      b. Secondary.
   2. Planting equipment.
      a. Corn.
      b. Oats.
      c. Special. (cash crop)
   3. Harvesting machinery.
      a. Cereal grain.
      b. Corn.
      c. Forage.
      d. Special. (cash crop)
   4. Material handling
      a. Augers, elevators, bunks, bucket elevators.
      b. Dairy equipment.
      c. Manure handling.

d. Feed processing.
   1) Portable mills.
   2) Electric stationary mills.
e. Crop drying equipment.
   1) bin.
   2) Batch.
   3) Continuous.

E. Units of operation of particular machines
1. Identify unit of operation.
2. Identify parts of particular unit.
3. Determine function as a whole unit and with respect to entire machine operation.
4. Trouble shooting.
5. Calibration.

Example: Hay Baler
a. History and types, trends.
b. Identification of parts.
c. Units of operation.
   1) Picking up.
      a) Function.
      b) Parts.
      c) Repair and adjustment.
   2) Feeding mechanism.
      a) Parts.
      b) Function.
      c) Repair and adjustment.
   3) Compressing mechanism.
      a) Parts.
      b) Function.
      c) Repair and adjustment.
   4) Tying mechanism.
      a) Parts.
      b) Function and sequence.
      c) Adjustment and checking.
   5) Drive chain and chasis.
      a) Parts.
      b) Function of operation.
      c) Repair and adjustment.

F. Economics of machinery
1. Leasing.
2. Renting.
3. Ownership.

G. Safety
1. Procedures in shop.
2. Procedures in repairing farm machinery.
3. Procedures in operating farm machinery.

H. Trends in farm machinery manufacturing.

IV. Motivation

A. Factory representative presentation.
B. Dealership visit.
C. Tour of a machinery manufacture.
D. Visuals on operation, maintenance, and repair.

V. Learning Activities

A. Occupational experience programs.
B. Classroom demonstration, student participation.
C. Student reports.
D. Worksheet assignments.
E. Assemble machinery.
F. Repair own farm machinery.

VI. Materials Needed

A. Books
1. Bainer, Kepner, and Barger. *Principles of Farm Machinery*. John Wiley & Sons, Inc.
2. Stone & Gulvin. *Machines For Power Farming*. John Wiley & Sons, Inc.

B. Bulletins and Operator's Manuals
1. Operator's manuals, various manufacturers.
2. Announcements of courses, State Vocational-Technical Institutes.
3. Supplemental reading, Farm Machinery Course, University of Wisconsin, Agricultural Engineering, Madison, Wisconsin.

C. Films and Filmstrips
1. "Basic Shop Safety," Jam Handy Corp. Filmstrip Series.
2. "Careers in Farm Machinery," Filmstrip and Tape. Vocational Education Productions. California State Polytechnic College, San Luis Obispo, Calif. 93401.
3. Farm Machinery Slide Series.
   a. Corn planter
   b. Combine
   c. Balers and knotters
   d. Balanced head mowers
   e. Basic hydraulics
   f. Corn forage harvesting equipment
4. "Tillage Tools," Slide Series, Oliver Corp.

D. Laboratory Manuals
1. Hunt. *Farm Power and Machinery Management*. Iowa State University Press.

E. Sources of other teaching materials
1. Deere & Co., Dept. F. Moline, Illinois 61265.
   a. *Fundamentals of Service*. Books, slides, transparency masters.
   b. *Fundamentals of Machine Operation*. Books, slides, transparency masters.
2. AAVIM.
   Booklets
   a. "Tractor Operation and Daily Care"

b. "Tractor Maintenance and Principles and Procedures"
c. "Farm Tractor Tune-Up and Service specifications"
d. "Small Engines - Care Operation, Maintenance and Repair"
e. "Tractor Fuels and Lubricants"
f. "Understanding and Measuring Horse Power"
g. "Selecting and Maintaining Field Mowers"
h. "Maintaining the Lighting and Wiring System"
i. "Understanding Electricity and Electrical Terms"

Slides are available on some subjects.

3. Agricultural Education Service. State Dept of Education and Ohio State University.
Booklets
a. "Plows and Plowing," 1969.
b. "Combines and Combining," 1970.
c. "Corn Pickers and Picking Corn," 1970.

4. Farm Field Machinery. Marshall Finner. University of Wisconsin. American Printing and Publishing Co., 2909 Syene Road, Madison, WI 53713
a. *Successful Farming Book on Machinery Management.*
b. *Successful Farming Ideas for All Around the Farm.*

5. Iowa State University Press.
a. *Farm Power and Machinery Management.* Hunt.
b. *Farm Machinery Mechanisms.* Hunt & Garver.

6. American Welding Society. 2501 N. W. 7th Street. Miami, Florida 33125.
a. *Welding Handbook.* 6th ed. 1972.

FARM MANAGEMENT

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in farm management and will be able to relate these factors to his/her own specific needs and aspirations.
B. Be familiar with such economic terms as resource, product, land, labor, capital, and management.
C. Apply the principles of marginal physical product, marginal value product, and law of diminishing returns.
D. Interpret the opportunity costs of given products.
E. Be familiar with the input-input and output-output relationships.
F. Comprehend the inter-relationships of the manager's role in farm businesses.
G. Identify the cost concepts which include fixed, variable, total, and marginal costs.
H. Define the revenue and supply concepts in given situations.
I. Recognize the concepts of risk and uncertainty.
J. Relate to the adjustments of uncertainty in given situations.
K. Draw conclusions of alternative methods to predict prices and yields.

II. Concepts to Develop

A. There are career opportunities in farm management for young men and women at all levels of educational preparation.
B. Farm managerial roles include the problem and scope of the management function, administration, and controlling the decision-making process of farm businesses.
C. A knowledge of basic economic principles and the relationship to farm management is necessary.
D. Successful farm operators have developed the ability to set up, use, and analyze farm records.
E. Farm financial records and analysis can be used to solve farm management problems.
F. Long range planning of farm businesses involve budgets, transition and annual planning, and cash flow statements.
G. Control and efficient utilization of capital resources of the farm business is basic to economic independence.
H. An accurate and complete inventory of all crop, livestock, and equipment must be available for management functions.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.

6. Other factors relating to student needs and aspirations.

B. Getting established in farming
   1. Opportunities in farming.
   2. Qualifications needed to become successful farmers.
   3. The need for training and where it may be obtained.
   4. Methods used to become established in farming.

C. Organizing and managing the farm business
   1. Combining the factors of production.
   2. Economic principles and concepts.
   3. Effect of the following on labor income.
      a. Size of business
      b. Crop production
      c. Livestock production
      d. Combining success factors
   4. Farm ownership and credit.
   5. Field arrangement.
   6. Farmstead arrangement.
   7. Farm buildings.
   8. Planning the farm business.

D. The role of the manager
   1. Problems of the manager.
   2. Management is a continuous process.
   3. Decision-making requirements.
   4. Alternative management decisions.

E. Basic economic background
   1. Definition of economic terms.
   2. Classification and definition of resources.

F. Basic economic principles
   1. Product functions.
   2. Law of diminishing returns.

G. Opportunity costs of agriculture
   1. Various opportunity costs.
   2. Application of opportunity costs.

H. Input and output relationships
   1. Physical relationships of a given product.
   2. Application of opportunity costs.

I. Cost concepts
   1. Various types of costs.
   2. Application of costs.
   3. Profit making decision process.

J. Basic revenue concepts
   1. Three revenue concepts.
   2. Supply concept of a product in reference to price and quantity of output.

K. Risk and uncertainty
   1. Aspects and conditions of risk and uncertainty.
   2. Decision criteria under varying states of knowledge.
   3. Types of uncertainty and risk.

L. Adjustments to reduce uncertainty
   1. Decision concerns of the individual manager.
   2. Conditions of society.

M. Methods for predicting prices and yields
   1. Plan on basis of expected prices and yields.
   2. Determine effect of uncertainty and risk.

N. Other management considerations
   1. Soil conservation and water management.
   2. Farm records and accounts.
   3. Protection from accidents and risks.
   4. Types of farm business organizations.
   5. Business law and legal matters.

IV. Motivation

A. Class discussion with data from actual farms or representative of typical farms in area.
B. Field trips to farms for collection of management data.
C. Develop problems for individual students to solve.
D. Utilize information in current farm literature.
E. Develop problems to be solved by class as a group.
F. Develop farm management games with actual winners being recognized.
G. Utilize guest resource people for class discussions.
H. Field trips to agribusinesses in area.
I. Utilize appropriate films, filmstrips, slides, etc.

V. Learning Activities

A. Occupational experience programs.
B. Farm survey of home farm.
C. Crop evaluation of enterprises grown on the home farm.
D. Evaluation of feed and balancing rations.
E. Preparation of an income tax estimate.
F. Livestock, crop, and equipment inventories on the home farm.
G. Income tax preparations.
H. Completion and interpretation of the farm business analysis and profit-loss statement-records from example farm.
I. Projection of crop and field plans and relation to livestock needs - home farm.

J. Evaluation of the net worth statement - home farm.
K. Short-and long-range planning estimates- home farm.

VI. Materials Needed

A. Books

1. Castle, Emery N., Manning H. Becker, and Fredrick J. Smith. *Farm Business Management.* MacMillan, Inc., 1972.
2. ———. *Doane's Farm Management Guide.* Doane Agricultural Service, Inc., ninth edition, 1971.
3. Herbst, John. *Farm Management—Principles, Budgets, Plans.* Stipes Publishing Co., 1968 (revised 1970).
4. Morteson, W. P. and I. F. Hall. *Approved Practices in Farm Management.* The Interstate Printers and Publishers, Inc., 1966.
5. Mortenson, W. P. and R. A. Luening. *The Farm Management Handbook.* fifth edition. The Interstate Printers and Publishers, Inc., 1972.

B. Pamphlets, bulletins

1. Bjoraker, Walter T. (ed.) "A Course of Study in Farm Management." Instructional Series No. 4, Agricultural and Extension Education Department, University of Wisconsin, 1973
2. ———. "Interpretation of Farm Business Analysis Transparency Masters." Agdex 810. The Ohio State University, 1971.
3. Kenmont, Thomas, R. N. Weigle, and Richard Hawkins. "Farm Financial Decision Making." A perspective. NCR 34-1. University of Wisconsin, 1973.
4. Showman, Bert. "A Teacher's Guide to Farm Money Management." Agdex 810. Ohio Agricultural Education Curriculum Materials Service, The Ohio State University, 1972.
5. Successful Farming Vo-Ag Teaching Service. "Farm Management." Teaching Unit No. 3. Des Moines, Iowa: Successful Farming, 1970.
6. Vande Walle, Virgil and Carl Olson. "An Introduction to Farm Management Principles." Resource Unit. Agdex 810. Fargo, North Dakota: North Dakota State University, Vocational Agriculture Association, 1969.
7. Vocational Agriculture Service. "Planning Your Farm Business." University of Illinois.
8. Vocational Agriculture Service. "Setting Up Farm Records to Provide for Analysis:" No. 2037. University of Illinois.

C. Periodicals

1. *Crops and Soils*
2. *Doane's Agricultural Report*
3. *Drovers Journal*
4. *Farm Journal*
5. *Farm Quarterly*
6. *Farm Technology*
7. *The Farmer*
8. *Hoard's Dairyman*
9. *Successful Farming*
10. *Wisconsin Agriculturist*
11. *Wall Street Journal*

D. Films, filmstrips, and slide sets (source examples)

1. Films
   a) "Credit-A Capital Idea." St. Paul, Minnesota: Film Library, Farm Credit Banks of St. Paul.
   b) "Electronic Revolution in Agriculture." (use of computers in farming) St. Louis, Missouri: Swank Motion Pictures, Inc.
   c) "Fact Finders." USDA. No. 6724. BAVI. Madison, Wisconsin: University of Wisconsin, 1967.
2. Filmstrips
   a) "Increasing Earnings Through Farm Records." No. 353. Color. Urbana, Illinois: Vocational Agriculture Service, Mumford Hall, College of Agriculture, Univerity of Illinois (many other titles also available).
3. Slide Sets
   a) "Agricultural Outlook Charts." No. A-55. Washington, D.C.: United States Department of Agriculture. Revised and released annually.

FLORICULTURE AND GREENHOUSE MANAGEMENT

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in floriculture and greenhouse management and will be able to relate these factors to his/her own specific needs and aspirations.

B. Define greenhouse management and list a minimum of five occupations in the area of greenhouse management.

C. Identify the specific floricultural businesses in the local area.

D. Be familiar with the employment opportunities available in greenhouse management for different geographical areas of the nation.

E. Demonstrate his/her ability to use the "Dictionary of Occupational Titles" by looking up an assigned D.O.T. number and title.

F. Identify and compare the plant growing structures in the community.

G. Identify and analyze the appropriateness of various materials for growing structures.

H. Make a sketch which includes size and materials, bench placement, heating, CO_2 and ventilating features, light orientation, humidity and temperature control, and cooling and watering equipment.

I. Compare costs of various types of structures using glass, plastic, and fiberglass.

J. Solve a problem relating to creating the condition needed to grow five common greenhouse plants having different environmental requirements.

K. Compute the cost of production when the kind and number of plants, spacing, and selling data are given.

L. Identify the common parts of plants, using either a diagram, or actual plant specimens.

M. Define the common terms relating to plant identification and growth habits and develop the vocabulary needed to describe them.

N. Use the Bionomial system of nomenclature in discussion and identification of common plant materials as directed by the instructor.

O. Explain how plant characteristics can be used for the purpose of identification.

P. Identify ten differences in plants as it relates to plant characteristics.

Q. Identify twenty common plants grown in the greenhouse by examination of actual plants or pictures.

R. Identify at least 15 common vegetable or flower seeds.

S. Identify the various types of growing media.

T. Discuss the characteristics of a growing medium.

U. Explain the methods of soil sterilization.

V. Demonstrate the proper methods of watering plants.

W. Describe the various types of fertilizers.

X. Prepare a soil sample for laboratory analysis.

Y. Demonstrate the methods of fertilizer application.

Z. Discuss the importance of controlling light, temperature, humidity, and air.

AA. Explain the importance of controlling plant pests.

BB. Compare the different principles and practices involved in the study of plant propagation.

CC. Discuss the basic factors involved in producing plants sexually from seed, including seed selection, growing media, temperature, light, and moisture.

DD. Explain the basic factors involved in producing plants asexually, including plant selection, media, temperature, light, and moisture.

ΞE. Identify the internal structure of plants in order to understand the root and shoot development of cuttings.

FF. Describe the parts of specialized buds, stems, and roots.

GG. Compare the purposes and methods of propagating plants asexually.

HH. Demonstrate the various methods and techniques of propagating plants by cutting.

II. Demonstrate the various methods and techniques of propagating plants by layering.

JJ. Explain the various methods and techniques of propagating plants by division.

KK. Demonstrate the various methods and techniques of propagating plants by grafting and budding.

LL. Contrast the various types of plant growth substances.
MM. Organize, maintain, and interpret records pertaining to a horticultural business.
NN. Evaluate and use the numerous trade catalogs and supplementary literature.
OO. Evaluate the products from a written description.
PP. Keep all records needed to manage a greenhouse.
QQ. Understand and fill out business forms used in ordering and receiving merchandise.
RR. Interpret and develop a production schedule which includes growing temperature, initial sales date, and sowing dates.
SS. Determine the production costs of greenhouse plants.

II. Concepts to Develop

A. There are career opportunities in greenhouse management and floriculture for young men and women at all levels of educational preparation.
B. Job description, working conditions, and personal qualifications vary with the various greenhouse occupations.
C. The retail floral industry consists of many small businesses with gross sales in excess of a billion dollars annually.
D. Job opportunities in floriculture and greenhouse management vary in different sections of the country.
E. Certain plants require specific structures for optimum growth.
F. Materials used in greenhouse construction should be durable, corrosion resistant, light in weight, inexpensive and be easily installed.
G. Greenhouses can be heated by using hot water, steam or forced hot air.
H. Several devices are available for controlling humidity in the greenhouse and for watering the plants.
I. There are several types of greenhouses which utilize glass, fiberglass, and plastic in its construction.
J. Light intensity and its duration must be controlled in the greenhouse.
K. Carbon dioxide levels influence plant growth.
L. Greenhouse ventilation is most frequently accomplished by using fans.
M. A greenhouse worker must be knowledgeable about plant identification, cultural practices, plant components and seeds.
N. A broad horticultural vocabulary is desirable for those working in a greenhouse.
O. Common and scientific names are used in plant identification.
P. The plant characteristics of stems, leaves, roots, flowers, fruit seed, sap, aroma, growth habits, size and form are valuable aids in identification.
Q. Classification keys are a valuable aid in plant identification.
R. Plants grown in the greenhouse vary in their cultural requirement.
S. Growing medias must have certain characteristics like firmness, porosity pH, water holding capacity, weed and disease freedom.
T. Light, temperature, humidity and ventilation are important considerations in the operation of a greenhouse.
U. Organic and inorganic fertilizer are essential for plant growth.
V. Plants grown in the greenhouse can be propagated in several ways.
W. Plants have specialized internal structures such as organs, tissues, and cells.
X. Asexual reproduction is a valuable tool in preserving true varieties and in reproducing plants which grow slowly from seeds.
Y. A successful greenhouse operator needs extensive knowledge and complete records.
Z. The production schedules of a greenhouse operation must be developed in relationship to marketing demands.
AA. Production costs are directly related to net profit.
BB. Spacing practices, temperature, watering, fertilizing and types of containers all have an effect on production costs.

III. Subject Matter to Teach

A. Careers
1. Occupation or job titles.
2. Type and level of education required.
3. Working conditions.
4. Personal qualifications needed.
5. Employment opportunities.
6. Scope of floriculture industry - local - state - nation.

B. Constructing, using, and maintaining plant growing structure
1. Functions of structures.
2. Types of greenhouses.
3. Other types of growing structures.
4. Greenhouse construction materials.
5. Heating greenhouses.
6. Watering devices and humidity control.
7. Ventilation.
8. Light control.

9. Temperature control.
10. Co_2 influences.
11. Bench materials and design.
12. Maintenance of greenhouse.
13. Greenhouse sizes and costs.

C. Plant material identification.
1. Reasons for plant identification.
2. Terms used to describe horticulture plants.
3. Binomial system.
4. Scientific nomenclature.
5. Plant identification characteristics.
6. Methods of identifying plants.

D. Greenhouse plant cultural requirements
1. Types of growing media.
2. Characteristics of growing media.
3. Soil or media sterilization.
4. Water application.
5. Fertilization.
6. Soil sampling and testing.
7. Light requirement.
8. Temperature requirements.
9. Humidity control.
10. Air movement.
11. Pest control and use of chemicals.

E. Propagation of common greenhouse plants
1. Science and act of propagation.
2. Sexual reproduction and advantages.
3. Asexual reproduction, methods, and advantages.
4. Internal plant structures.
5. Root development and root types.
6. Types of buds.
7. Stem types.
8. Taking and preparing cuttings.
9. Rooting cuttings successfully.
10. Methods of layering.
11. Plant division.
12. Grafting.
13. Budding.
14. Plant growth regulators.

F. Production costs and marketing.
1. Record keeping.
2. Daily records.
3. Operating statements.
4. Balance sheets.
5. Trade catalogues.
6. Ordering materials.
7. Various forms used.
8. Production schedules.
9. Production costs.
10. Spacing practices.
11. How, when, and where to market.
12. Pricing of the product.
13. How to deal with customers.

IV. Motivation

A. Laboratory exercises or greenhouse projects.
B. Field trips to local greenhouses and retail outlets.
C. Bulletin board displays.
D. Filmstrips, films, and slide sets.
E. Resource speakers.

V. Learning Activities

A. Skills to be learned in an occupational experience program:
1. From an index of job titles prepare a list of occupations in the floricultural and greenhouse management cluster nation-wide, state-wide, and county-wide.
2. Have students use the colored slides that are designed to acquaint the students with the various types of jobs in ornamental horticulture.
3. Students interview greenhouse workers concerning their jobs.
4. Students clip and report on "help wanted" ads from large city newspapers. These should be in the horticulture job clusters.
5. Students complete a hand out sheet on the use of the "Dictionary of Occupational Titles."
6. Students look up and report on advanced training programs available in the ornamental horticulture job cluster.
7. Survey the types of structures used in the area for floriculture.
8. List materials used in greenhouse construction.
9. Make a list of specifications for a specific greenhouse.
10. Collect commercial data (catalogues, etc.) on equipment available.
11. Obtain facilities and equipment cost figures from local dealers.
12. Grow plants under varying environmental conditions.
13. Work a sample problem based on data supplied on number of plants, spacing, and selling date.
14. Make drawings and label parts of a plant (roots, stems, seeds, fruit, flowers, etc.).
15. Examine various plants; compare and identify their parts.
16. On a study sheet define a list of terms relating to plant identification.

17. Collect examples of plants to demonstrate terms on study sheet.
18. Have students turn in a short report describing a plant of their choice using the vocabulary being studied.
19. Determine common botanical names of plants commonly found in the greenhouse.
20. Using the binomial system convert common names of horticultural plants to scientific or vice versa.
21. Have students bring in specimens and properly identify flower type, stem, type of leaf, and root.
22. Collect specimens of plants that show characteristics discussed in class.
23. Identify plants brought in by the instructor.
24. Students make a collection of seed and nursery catalogs for help in plant identification.
25. Students make a collection or booklet of colored pictures of flowers and other greenhouse plants.
26. Have students review identification of plant material by viewing filmstrips or slides (Example — "Annuals Illustrated").
27. Have the students make a collection of the common seeds used in the greenhouse and identify them.
28. Students learn to identify seeds from samples in plastic packs (materials available from Vitality Seed Co.).
29. Lay out physical samples of each growing medium.
30. Grow plants in soils of various texture (clay, loam, sand) and compare different cultural practices.
31. Demonstrate the drainage of water and water holding abilities of various media.
32. Students mix up a growing mixture that will be used for growing a plant.
33. Demonstrate a soil porosity test.
34. Set up a time-labor schedule showing the different costs for keeping a flat weeded as compared to one which has been sterilized.
35. Students sterilize media by means of both chemicals and heat.
36. Demonstrate results of different frequencies of application of water on plants.
37. Demonstrate the proper methods of watering plants.
38. Display diagrams of methods of watering.
39. Lay out physical samples of organic and inorganic fertilizers.
40. Grow plants under normal fertilization and others under deficiency conditions. Observe reaction of plants.
41. Display a fertilizer sack, check its analysis and write a report on the nutrients supplied by it.
42. Students collect and test soil samples.
43. Demonstrate how liquid fertilizer solutions are made up.
44. Demonstrate the effect of proper, excess, and deficient light, temperature, humidity and air on plants.
45. Demonstrate phototropism in plants.
46. Demonstrate water needs of a plant grown in different relative humidities.
47. Demonstrate the effects of temperature on plants subjecting them to different degrees of temperature.
48. Identify insects, weeds, and diseases on plants grown in the area.
49. Have students write identifiable characteristics of insects, weeds and diseases.
50. Display sample bags and/or containers of chemicals, pointing out the following:
    a. Active ingredients.
    b. Inert ingredients.
    c. Warning label.
51. Students display diagrams showing various propagating structures.
52. Have students write a paper on propagation.
53. Look through seed catalogs and see types of seeds, prices, growing structure, etc.
54. Display a diagram which shows how a seed is produced.
55. Prepare a growing media for germinating seeds.
56. Prepare a table showing all plants that can be propagated asexually and method of propagation.
57. View transparencies showing different methods of propagation.
58. Demonstrate how environmental factors affect rooting.
59. Prepare a series of illustrations indicating the parts of a herbaceous and woody stem.
60. Prepare and display live specimens of herbaceous and woody stems.
61. Display live specimens of buds, stems, and roots, discuss their functions and identify parts orally or in writing.

62. Prepare a written report on the reasons for asexual reproduction of plants including advantages and disadvantages.
63. Demonstrate to the class how a cutting is made using the following methods and plants as examples:
    a. Stem cutting
        1) Coleus
        2) Chrysanthemum
        3) Geranium
    b. Leaf cutting.
        1) Begonia rex
        2) African violets
        3) Peperonia
    c. Root cutting.
        1) Red raspberry
        2) Holly
64. Display diagrams on layering methods and have students draw each method.
65. List plants that can or must be propagated by division and indicate the method used.
66. Use gibberellic acid on geranium blossoms before they open. Compare the difference between control and experimental group.
67. Treat seeds with gibberellic acid at different concentrations and compare plants as to size and color.
68. Display various types of growth regulators. Have students write a paper on the use of each type.
69. Students report on reasons why management must have records.
70. Students develop a current list of materials on horticultural subjects.
71. Students develop a personal library and notebook of bulletins and reference materials.
72. Students to review and report on current magazines and journals in the horticulture areas.
73. Students plan and order the material needed to raise a crop of bedding plants.
74. Study sample business forms.
75. Simulate a day's operation of a greenhouse and have students fill out forms that are usually used.
76. All classroom and laboratory projects that require supplies and materials would be ordered on forms similar to those used in a greenhouse.
77. Students fill out sample checks, receipts and sale tickets for the above problem.
78. Analyze a production schedule obtained from a local greenhouse.
79. Students develop a complete production schedule for all plants they will be growing in the greenhouse.
80. List the items that make up production costs.
81. Calculate cost of bench space using different pot spacing for geraniums. (Apply thumb rules.)
82. Calculate the cost of production for a crop of geraniums started from rooted cuttings started on February 15th and ready for initial sale by May 15. Other sales dates to be determined by spacing and temperature.
83. Develop a marketing strategy that is related to holiday periods and other peak periods.
84. Set up advertising schedule to be used in conjunction with the marketing strategy.
85. Having completed the production schedule and having a marketing strategy, determine the price that must be charged to make a reasonable profit.
86. Relate marketing strategy to competition, quality of merchandise, and economic conditions in the area.

VI. Materials Needed

A. Books

1. Ball. *The Ball Red Book.* George Ball, Inc. West Chicago, Illinois 1972.
2. Better Homes and Gardens, *House Plants.* Meredith Press, Des Moines, Iowa. 1963.
3. *Dictionary of Occupational Titles,* Vol. I & II, Occupational Classification, U. S. Department of Labor, Current Edition.
4. Editors of Sunset Books and Sunset Magazines. *Sunset Basic Gardening.* Lane Books, Menlo Park, California.
5. Everett. *Reader's Digest—Complete Book of the Garden.* Reader's Digest Association, Pleasantville, New York. 1966.
6. Harshberger. *McCall's Garden Book.* Simon and Schuster, Rockefeller Center, 630 Fifth Avenue, New York, NY. 1968.
7. Hay & Synge. *The Color Dictionary of Flowers and Plants for Home and Garden.* Crown Publishers. 1969.

8. Hoover. *Handbook of Agricultural Occupations.* Interstate. 1967.
9. Nelson. *Flower and Plant Production.* Interstate. 1967.
10. Pfahl. *The Retail Florist Business.* Interstate. 1968.
11. Pinney. *Operating a Garden Center.* American Nurseryman. 1963.
12. Roy. *Exploring Agribusiness.* Interstate. 1967.

B. Pamphlets and Bulletins
1. "Cornell Recommendations for commercial Floriculture Crops," College of Agriculture, Cornell University, Ithaca, NY. 1971.
2. "Geigy-Lawn and Garden Insect Control Manual," Current Issue. Geigy Chemical Co.
3. "Ortho-Lawn and Garden Book 259." Chevron Chemical Co., Ortho Division, San Francisco, California.
4. "Vocational Horticulture Buildings and Equipment." Trans Sphere Trading Corp., Offices, Warehouse 1059 Sutton Ave., Mobile, Alabama.
5. Walsh and Beatty. "Profitable Management of Wisconsin Soils." American Printing & Publishing, Inc., 2909 Syene Rd., Madison, WI. 1963.

C. U.S.D.A. Bulletins*
1. "Growing Azaleas and Rhododendrons," Home and Garden Bulletin, No. 71.
2. "Growing Chrysanthemums in the Home Garden," Home and Garden Bull. No. 65.
3. "Growing Dahlias," Home and Garden Bulletin, No. 131.
4. "Growing Flowering Annuals," Home and Garden Bulletin, No. 91.
5. "Growing Flowering Perennials," Home and Garden Bulletin, No. 114.
6. "Growing Gardenias," Home and Gardening Bulletin, No. 67.
7. "Growing Iris in the Home Garden," Home and Garden Bulletin, No. 66.
8. "Growing Pansies," Home and Garden Bulletin, No. 149.
9. "Growing Peonies," Home and Garden Bulletin, No. 129.
10. "Insects and Related Pests of House Plants: How to Control Them," Bull. 67.
11. "Roses for the Home," Home and Garden Bulletin, No. 149.
12. "Selecting and Growing House Plants," Home and Garden Bulletin No. 82.
13. "Spring Flowering Bulbs," Home and Garden Bulletin, No. 136.

D. Wisconsin Extension Bulletins
1. "Enjoy Dahlias," Circular 544.
2. "Flowering Potted Plants," Circular 511.
3. "Growing Gladiolus in Wisconsin," Circular 543.
4. "How to Grow African Violets," Circular 437.
5. "How to Grow Tuberous Rooted Begonias and Gloxinias," Circular 496.
6. "Insect and Disease Control in the Flower Garden," Circular 592.
7. "Lilies," Circular 609.
8. "Mums for Fall Beauty: Tips on Growing "Chrysanthemums," Circular 532.
9. "Spring Bulbs," Circular 504.
10. "Success with Bedding Plants," Special Circular 100.
11. "Success With Peonies," Circular 494.
12. "Understanding Pesticide Labels," Special Circular 150.
13. "Using Flowers in Your Home," Circular 552.

E. Catalogs
1. George Ball, Inc., West Chicago, Illinois 60185.
2. Farmer Seed and Nursery Co., Faribault, Minnesota.
3. Jung's Seed Co., Randolph, Wisconsin.
4. NASCO, Fort Atkinson, Wisconsin.
5. Northrup King Seeds, Bedding Plant Department, 1500 Jackson Street, N. E. Minneapolis, Minnesota, 55413.
6. Old's Seed Co., Madison, Wisconsin.
7. The Vitality Seed Company, 4115 Jackson Road, Ann Arbor, Michigan, 48103.
8. Wayside Gardens Co., Mentor, Ohio 44060. (Cost — $2.00)

F. Slides and Transparencies
1. "Careers in Horticulture (Slides), Ohio State University.
2. "Garden Flowers" - Annuals, Part I and II (Slide Sets), Voc. Ag. Service, 434 Mumford Hall, Urbana, Illinois.
3. "Modular Design Concept: Annuals Illustrated." (Berninger, Louis) Available from NASCO, Ft. Atkinson, Wisconsin.

*All bulletins may be obtained from: The U.S. Government Printing Office, Washington, D.C. 20402

4. "Plant Identification . . . Annuals, Perennials, and House Plants," California State Polytechnic College, San Luis Obispo, Calif. 93401.
5. "What is Horticulture?" James Utzinger. Pleasant View High School, Vo-Ag Service, Univ of Illinois, Urbana, Illinois.

G. *Instructional Units*
1. Beringer. *Flower Gardening I.* University of Wisconsin Extension.
2. Berninger. *Flower Gardening II.* University of Wisconsin Extension.
3. Berninger. *Gardening Illustrated.* NASCO Fort Atkinson, Wisconsin.
4. Berninger. *Operation of a Garden Center.* University of Wisconsin Ext.
5. *Course Outline for Horticulture.* Service Occupations, Series of 12 Modules by Ohio State University, 980 Kinnear Road, Columbus Ohio, Agdex $\frac{940}{017}$
   a. "Exploring Occupational Opportunities in Ornamental Horticulture." Agdex $\frac{901}{017}$
   b. "Identifying Horticultural Plants," Agdex $\frac{200}{017}$
   c. "Propagating Horticultural Plants," Agdex $\frac{200}{017}$
   d. "Growing Horticultural Plants Agdex," $\frac{200}{017}$
   e. "Using Soil and Other Plant Growing Media Effectively," Agdex $\frac{200}{017}$
   f. "Recognizing and Controlling Plant Pests," Agdex $\frac{600}{017}$
   g. "Constructing, Maintaining, and Using Plant Growing Structures," Agdex $\frac{731}{017}$
   h. "Agricultural Salesmanship," Agdex $\frac{904}{017}$
6. Hemp. *50 Laboratory Exercises for Vocational Ornamental Students.* Interstate.
7. Hemp. *Ornamental Horticulture Source Units for Vocational Teachers.* Interstate.
8. *Horticulture Occupations.* Agricultural Cooperative Training, Texas A & M University, Agricultural Education Teaching Materials Center, College Station, Texas.
9. *Suggested Outline For A High School Ornamental Horticulture Curriculum.* VEP. California State Polytechnic College, San Luis Obispo, Calif. 93401.

H. Tapes and Cassettes
1. "Choosing a Career - Ornamental Horticulture." Vo-Ag Service, 434 Mumford Hall, Urbana, Illinois.
2. Cassettes to go with *Gardening Illustrated* – NASCO

FORESTRY

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the forest industry and will be able to relate these factors to his/her own specific needs and aspirations.
B. Be familiar with terminology used in the forestry industry.
C. Apply needed skills and knowledge to successfully manage a family — owned forest or woodlot.
D. Identify the major tree species in Wisconsin.
E. Understand the growth processes of trees.
F. Distinguish between the products of different tree species.
G. Describe and identify disease and insect damage found on common Wisconsin trees.
H. Explain measures which can be effectively employed to control insects and diseases common to Wisconsin's forests.
I. Discuss fire fighting techniques.
J. Operate a chain saw safely.

II. Concepts to Develop

A. There are career opportunities in the forest industry for young men and women at all levels of educational preparation.

B. A thorough knowledge of the characteristics of a species is essential for correct identification.
C. Many skills and techniques are needed by those seeking employment in the forest industry.
D. Forests and woodlands are a source of recreational activities and they also produce numerous products which contribute significantly to the nation's economy.
E. Proper site and soil selection are essential for successful tree propagation.
F. Successful plantation and forest management requires that a person be knowledgeable and possess numerous skills.
G. The harvesting and marketing of forest products requires a special body of knowledge.
H. Federal and state policies and programs have had an impact on woodland and forest establishment and maintenance.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Opportunities in forest occupations
1. Employee.
a. Genetics.
b. Forester.
c. Logger.
d. Processing
1) Sawmill operator.
2) Paper industry.
3) Wood products manufacturing.
a) Furniture.
b) Industrial use.
e. Sales
1) Lumber yard.
2) Farm supplies.
2. Owner — Manager — Grower
a. Pulpwood.
b. Saw logs.
c. Christmas trees.
d. Recreation.

D. Forest botany
1. The study of trees (dendrology).
a. Classification of woody plants (taxonomy).
b. Use — as means of identification.
c. Important types of forest trees of the United States.
1) Geographic distribution.
2) Characteristics.
3) Habitat.
2. Tree physiology
a. Anatomy.
b. Growth.
c. Reproduction.
d. Adjustment to environment.
3. Transpiration
a. Functions.
b. Amounts of water or moisture.
4. Geology and Forest Soils
5. Production and management practices of a forest (silviculture).
a. Forest growth.
b. Thinning and cutting.
6. The forest environment (ecology).
a. Soil and nutrients.
b. Climate and seasons — weather factors.

E. Tree identification
1. Genuses and species.
a. Pine and larch.
1) Characteristics.
2) Habitat.
3) Major commercial use.
b. Fir, hemlock and spruce.
(1, 2, 3 - as above)
c. Cedar.
(1, 2, 3 - as above)
d. Sequoia, redwood, juniper.
(1, 2, 3 - as above)
e. Oak, maple, ash.
(1, 2, 3 - as above)
f. Others (of local interest).
2. Specimens and photographs
a. Preparation.
b. Examination.

F. Forestry skills and techniques
1. Units of measurement - forest products.
2. Land measurement and surveying.
3. Cruiser stick.
4. Scaling logs.
5. Methods of forest inventory.
6. Growth rates.
a. Methods of finding growth rates.
b. Permanent sample plots.

G. Woodlands and forestry
1. Farm woodlands.
a. Size and extent of national total.
b. Problems of management.
1) Agencies involved.
2) Legislation affecting.
3) Future potential.
2. Industrial forests.
a. Size and extent of national total.
b. Management policies.

3. National, state, county and municipal forests.
   a. Size and extent of national total.
   b. Management policies and problems unique to each.
4. Services from woodlands.
   a. Wood products.
   b. Soil and water conservation.
   c. Wildlife and recreation.
5. Forest regions of the U. S.
6. Woodlands in the national economy.
7. History of woodland utilization.
8. Phases of woodland management.
   a. Forest protection.
   b. Management for continuous production.
   c. Reforestration.
   d. Harvesting.
   e. Wood utilization and national trends.

H. Nursery management
1. Soil requirements.
2. Mechanics of planting seed.
3. Protection practices.
   a. Frost.
   b. Insects.
   c. Diseases.
   d. Rodents and wildlife.
4. Transplanting.
5. Harvesting.

I. Propagation and plantings of hardwood seeds, nuts and cuttings.
1. Selection factors.
2. Propagation by cuttings.
3. Propagation by seeds and nuts.
4. Nuts needing stratification.
5. Germination time.

J. Site selection
1. Soil
   a. Origin, composition, and importance of
      1) What is soil.
         a) Horizons.
            1) Color.
            2) Texture.
            3) Structure.
            4) Depth.
      2) How soil forms.
         a) Rock weathering.
            1) Heating and cooling.
            2) Water freezing.
            3) Plant roots.
            4) Wind and water.
         b) Growth and decay of plants.
      3) Composition of soil.
         a) Fertilizer elements and pH.
         b) Air
         c) Water,
      4) Color as related to material present when soil was formed.
         a) Air present when soil was formed.
            1) Effect of poor drainage.
         b) Organic matter present when soil was formed.
         c) Color and type of rocks which formed parent material.
         d) Significance of soil.
   b. Suitability of various soils for growing plants.

K. Tree Planting
1. Selection factors.
2. Ordering trees.
3. Plantation, windbreak and shelterbelt planning.
   a. Selection of species.
   b. Spacing.
   c. Direction of rows.
   d. Accessways and firebreaks.
4. Site preparation.
5. Handling of nursery stock.
6. Planting techniques.
   a. Machine planting.
   b. Hand planting.
7. Protecting seedlings from white grub.
8. Fertilizer usage.
9. Maintenance.

L. Plantation and forest management
1. Protection from fire, insects, disease and wildlife.
   a. Cause.
   b. Symptoms and detection.
   c. Prevention and control.
2. Protection from competition.
3. Management practices influencing growth rates.
   a. Intermediate cuttings.
      1) Clear cuttings.
      2) Improvement cuttings.
      3) Liberation cuttings.
      4) Thinnings and prunings.
      5) Salvage and sanitation cuttings.
      6) Timber stand improvement.
   b. Methods that promote reproduction.
      1) Selection methods.
      2) Clear cutting method.
      3) Shelter wood method.
      4) Seed tree method.

5) Maturity and forest age factor.
c. Economic aspects of intensive management.

M. Harvesting woodland products
1. Logging.
a. Felling the tree
1) Proper use of saws and other tools.
2) Controlling direction of fall.
3) Types of backcuts and undercuts.
b. Limbing.
c. Bucking.
d. Skidding.
e. Safety in logging (OSHA).
f. New equipment and methods.
2. Transportation
a. Loading devices and loading methods.
b. Truck and rail capacities.
c. Shipping weights and costs.
3. Sawmill operation
a. Nomenclature of the circle saw head rig.
b. Operation of the saw mill.
c. Operation of accessories and special devices.
1) The edger.
2) Hydraulic log turners.
3) Planer.
4) Others.
d. Power sources and supply.
e. Saw sharpening and mill maintenance.
f. Sawing quality lumber.
g. Custom sawing.
4. Seasoning lumber.
a. Air drying.
1) Rules for piling.
2) Seasoning defects and their prevention.
b. Kiln drying.

N. Marketing woodland products
1. Considerations in marketing.
a. Distance from market.
b. Quality of product factors.
c. Utilization practices.
1) Materials available for sale.
2) Theory of highest use.
2. Stumpage values.
a. Determining factors.
1) Selling price of final product.
2) Logging and milling costs.
3) Percentage of profit.
b. Use of published guides.
1) Timber marketing bulletins.
2) U. S. Crop reporting service bulletins.
c. Relative merits of selling stumpage.
3. Sale of logs
a. Definition of log grades.
b. Detailed procedure for grading.
c. Variations in grading rules.
4. Sale of pulp and cordwood.
5. Sale of sawed lumber.
6. Sale of Christmas trees.
7. Sale of maple syrup.
8. Sale of miscellaneous products.
a. Veneer.
b. Staves.
c. Flooring.
d. Lumber.

TABLE I — GENERAL TREE SELECTION GUIDE

Soil	Open South & West Slopes	Open North & East Slopes	Partial Shade	Open Level
Very Sandy	JP	JP, NP		JP
Sandy	JP, NP	NP, WP, JP	WP	JP, NP
Sandy Loam	NP, WP, JP	NP, WP, WS WC, WA, NS, NP	WP, WS, WC, WA, NS	WS, WC, WP NP, JP, WA, NS
Loam	WP, WA, NP	WP, WS, WC, WA, NS, NP	WP, WS, WC, WA, NS	WS, WC, WP, NP, JP, WA, NS
Clay	WA, NS, WP	WS, WC, WA, NS, WP	WS, WC, WP, WA	WC, WS, WP, NS, WA

Code:
WA – White Ash; JP – Jack Pine; NP – Norway (Red) Pine; WP – White Pine; WS – White Spruce; NS – Norway Spruce; WC – White Cedar

e. Fence posts.
f. Pallets.
g. Charcoal.

9. Timber sale contracts.
   a. Merits of a written contract.
   b. Essential points covered in a contract.
   c. Study of a model contract.

O. Multiple use of forestry lands

1. Forestry research.
   a. Role of industry.
   b. Role of federal and state governments.
2. Forest products.
   a. Lumber.
   b. Pulpwood.
   c. Chemical and fuel wood.
   d. Turpentine, resin, rosin wood tar, rosin oils, pitch.
   e. Other products.
      1) Maple syrup and sugar.
      2) Medicinal roots, barks, and herbs.
      3) Decorations – evergreen branches, pine cones, Christmas trees.
3. Water conservation.
   a. Humidity.
   b. Precipitation.
   c. Evaporation.
   d. Soil moisture.
   e. Erosion and floods.
   f. Watershed management.
4. Range management advantages.
   a. To ranchers and stockmen.
   b. To forest lands.
5. Wildlife management.
   a. Practices and problems.
   b. Considerations for:
      1) Fur industry.
      2) Gamesmen.
      3) Sportsmen.
6. Recreation areas.
   a. Administration.
      1) Private lands.
      2) Municipal and county parks.
      3) State lands.
      4) Federal lands.
   b. Uses.
      1) Picnicking.
      2) Hunting and fishing.
      3) Other recreational activities–ski courses, etc.

P. Public and private forestry policies and programs

1. Federal responsibilities.
   a. Forest Service, Department of Agriculture.
      1) Manages nation's forest lands.
      2) Maintains experimental research stations.
      3) Cooperates with states in forest protection and reforestation.
   b. Soil Conservation Service Department of Agriculture.
      1) Develops conservation methods and techniques.
      2) Advises on conservation problems and policies.
   c. National Park Service, Department of Interior.
      1) Advises on preserving park lands in natural state.
      2) Provides staffs for national parks.
      3) Maintains national monuments.
2. State responsibilities.
   a. State forestry departments.
      1) Direct state experimentation and conservation programs.
      2) Acquire and manage state forests.
      3) Direct reforestation of state lands.
      4) Conduct public information and education programs.
      5) Provide technical assistance to the counties for management of county forest lands.
      6) Cooperate with private owners and federal government in forest management and research.
3. Private forestry activities.
   a. American Forestry Association.
      1) Conducts national research and information programs.
      2) Promotes and encourages improvement in use of forests.
      3) Publishes "American Forester."
   b. American Forest Products Industries, Inc.
      1) Originates national programs of information and education.
      2) Coordinates national "Keep America Green" fire-prevention program.
   c. American Forest Institute
      1) Coordinates American tree farm system.
      2) Releases literature and provides information to crisis areas.

d. School and Future Farmers of America forests.
e. Forestry camps and experimental stations.
f. 4-H Clubs.
g. Farm and civic organizations.

4. Forestry legislation
   a. Need.
      1) Protect forest lands.
      2) Guarantee forest lands.
      3) Renew harvested and devastated areas.
   b. Federal
      1) The Weeks Laws of 1911.
         a) Keystone of interstate and Federal-State cooperation in the protection of watersheds and navigable streams.
         b) Authorized appropriation of funds for the purchase of forest lands at the headwaters of navigable streams.
      2) National Park Service Establishment Act of 1916 – authorized full-time supervisory and protective responsibility for national parks.
      3) McNary-McSweeney Act of 1928 – authorized Federal appropriations for nationwide forestry research.
      4) Civilian Conservation Corps Establishment Act of 1933 – authorized appropriations for forestration, fire control and research (of historic significance – no longer in effect).
      5) Cooperative Forest Management Act of 1956.
         a) Authorized appropriations for reforestation.
         b) Approved encouragement of private services to timberland owners.
      6) Forestry Incentive Program – 1973.
   c. State of Wisconsin.
      1) Forest crop and woodland tax law
         a) Taxes deferred until crop is harvested.
         b) Reduced taxes due to long-term income.
      2) County Forest Crop Law.

IV. Motivation
   A. Field trip to a nearby woodlot or small forest with a variety of tree species.
   B. Trip to a pulpwood processing plant for a day.
   C. Visit a lumber yard with different grades and types of lumber.
   D. Visit a sawmill and observe the various operations and mechanization of a modern facility.
   E. Bulletin board displays.
   F. Films, filmstrips and slides.
   G. General information film on forestry.

V. Learning Activities
   A. Occupational experience programs.
   B. Demonstrate the safe use of a chain saw.
   C. Plant trees in a nearby woodlot or school forest.
   D. Prune trees in a nearby woodlot or school forest.
   E. Have each student sharpen an axe properly.
   F. Identify trees surrounding the school neighborhood.
   G. Estimate board feet of lumber in standing timber.
   H. Select and mark trees for cutting.

VI. Materials Needed
   A. Books
      1. Berger. *Introductory Soils.* Macmillan Co.
      2. Clepper & Meyer. *The World of Forests.* D. C. Heath Co. 1965
      3. Collingwood & Brush. *Knowing Your Trees.* American Forestry Association. 1964.
      4. Dilworth. *Log Scaling and Timber Cruising.* Oregon State University Press. 1964
      5. Duerr. *Fundamentals of Forestry Economics.* McGraw-Hill Co. 1960.
      6. Frome. *Whose Woods These Are: The Story of the National Forests.* Doubleday 1962
      7. Hanaburgh. *Your Future in Forestry.* Richard Rosen Press, New York. 1962.
      8. *Madison School Forest.* Madison Public Schools Curriculum Division. 545 W. Dayton St. Madison, Wisconsin. 1963.
      9. McCormick. *The Living Forest.* Harper & Row. 1959.
      10. Meyer. *Forestry as a Profession.* Society of American Foresters. Washington D.C. 1965.

11. Perry. *Exploring the Forest.* McGraw-Hill. 1962.
12. Perry & Greverus. *Foresters and What They Do.* Franklin Watts, Inc. New York. 1963.
13. Shirley. *Forestry and Its Career Opportunities.* McGraw-Hill, 1964.
14. U. S. Department of Agriculture. Trees — *Yearbook of Agriculture.* Government Printing Office. 1949.
15. Vardaman. *Tree Farm Business Management.* Ronald Press. 1965.
16. Wackerman. *Harvesting Timber Crops.* McGraw-Hill. 1966
17. *Wisconsin Trees and Woods.* University of Wisconsin-Extension. 1965.
18. Zivuska. *U. S. Timber Resources in a World Economy.* John Hopkins Press, 1967.

B. Bulletins and Pamphlets

1. "Animal Tracks," Wisconsin Conservation Department.
2. "Conservation Reserve," Bulletin 227, University of Wisconsin-Extension.
3. "Deciduous Shrubs," Circular 590. University of Wisconsin-Extension.
4. Farm Safety Review — Reprints of Article on "Chain Saw Safety," National Safety Council. Chicago, Ill.
5. "The Farmer and Wildlife," Wisconsin Conservation Department.
6. "Farming Our Forests," U. S. D. A. Forest Service.
7. "Forest Trees of Wisconsin," Bulletin No. 507, Wisconsin Conservation Department.
8. "The Forest Tax Laws of Wisconsin," Circular 479, University of Wisconsin-Extension.
9. "Growing and Selling Christmas Trees," Circular 425, University of Wisconsin-Extension.
10. "Growing White Pine," Bulletin No. 5, Wisconsin Conservation Dept.
11. "Guide for Christmas Tree Shearing," Wisconsin Dept. of Forestry.
12. "Horicon Marsh," Wisconsin Conservation Department.
13. "Instructions On Using Scale Stick for Measuring Trees and Logs." Wisconsin: Trees for Tomorrow, Merrill, WI.
14. "It's A Tree Country," American Forest Products Industries, Inc. Washington D. C.
15. "Learning to Know Common Wisconsin Trees," Circular 435, University of Wisconsin-Extension.
16. "Managing Small Woodlands," American Forestry Association. Washington D.C.
17. "Marketing and Harvesting Farm Timber," Circular 455. University of Wisconsin-Extension.
18. "More Money for Your Logs," U. S. Forest Service, U.S.D.A. Washington, D.C.
19. "More Money for Your Logs When Properly Cut," Wisconsin Conservation Department.
20. "Now You're Logging Safely," Employers Mutual of Wausau, Wisconsin
21. "Oak Wilt," Bulletin No. 1, Wisconsin Conservation Department.
22. "Oak Wilt in Wisconsin," Bulletin No. 9, Wisconsin Conservation Dept.
23. "People and Timber," No. 721, U.S.D.A., Misc. Pub. Milwaukee, Wis.
24. "Pine Saw Fly," Bulletin No. 4, Wisconsin Conservation Department.
25. "Producing Boltwood," Circular 415, University of Wisconsin-Extension.
26. "Pruning Pine Plantations," Pub. 529-59. University of Wisconsin-Extension.
27. "Root Rots of Conifers," Bulletin No. 2, Wisconsin Conservation Dept.
28. "Rural Zoning in Wisconsin," National Safety Council. Chicago, Ill.
29. "Safe Use of Power Chain Saws," Employers Mutual of Wausau, Wisconsin.
30. "School Forests — A Handbook," Circular 387, University of Wisconsin-Extension.
31. "Stem Canker," Bulletin No. 3, Wisconsin Conservation Department.
32. "The Story of Lumber and Allied Products," American Forest Products Industries, Inc. Washington, D.C.
33. "The Story of Pulp and Paper," American Forest Products Industries, Inc. Washington, D. C.
34. "Tree Planting in Wisconsin," Bulletin No. 507, Wisconsin Conservation Department.
35. "Wildlife, People and the Land," Bulletin No. 621, Wisconsin Conservation Department.
36. Wildlife Resource Chapter of the Natural Resources of Wisconsin Wisconsin Conservation Department.
37. "Winter Feeding Wildlife," Wisconsin Conservation Department.
38. Wisconsin Conservation Films, Slides, Display Sets. Wisconsin Conservation Department.

39. "Wisconsin Forest Resources," Wisconsin Conservation Department.
40. "Wisconsin Maple Products," No. 335. Wisconsin Dept. of Agriculture, Madison, Wisconsin.
41. "Wisconsin Predator Control," Wisconsin Conservation Department.
42. "Wisconsin Stream Improvement," Pub. 220. Wisconsin Conservation Department.
43. "Wisconsin Wild Flowers," Wisconsin Conservation Department.
44. "Wisconsin Wild Life," Pub. 613. Wisconsin Conservation Department.
45. "Wisconsin's Forests," Wisconsin Conservation Department.
46. "Your Forester and You," U. S. Forest Service U.S.D.A. Washington, D.C.

C. Films (available from BAVI)
1. "Forest" (2458)
2. "Forest and Conservation" (0755, 0756)
3. "Forest Conservation" (0758)
4. "Forest Grows" (0759)
5. "Forest Produces" (0760)
6. "Forest Ranger" (2786)
7. "Forestry" (4558)
8. "Forests" (4925)
9. "Silent Killer" (4929)
10. "Smoke Jumpers" (4345)
11. "Studying the Sawfly" (3629)
12. "Tree Bank" (3897)
13. "Tree Grows for Christmas" (2267)
14. "Tree Portraits" (3837)
15. "Trees Are A Crop" (2269)
16. "Trees for Shelter" (4431)
17. "Trees for Christmas" (4430)
18. "Trees for Tomorrow" (2270)
19. "Trees: How We Identify Them" (4376)
20. "Trees to Tribune" (2272)
21. "Your Friend the Tree — Save It or Destroy It" (3172)

D. Slides (available from NASCO)
1. "The Forest" (01529)
2. "Forest, Soil and Water" (0405)
3. "Full Set of Trees of Northern United States for Identification" (0995-01074)
4. "Identifying Coniferous Trees" (01227-504)
5. "Managing Forests Through Cutting Practices" (01584-20-8)
6. "Measuring and Marketing Timber" (01585-20-9)
7. "Planning the Forest Enterprise" (01643-F58)
8. "Protecting Forests From Forest Fires" (01346)
9. "Protecting Forests From Undesirable Secies" (01345)
10. "Protecting Trees From Insects and Diseases" (01583-20-7)
11. "Regenerating a Stand of Forest Trees" (01344)
12. "Safety in Operating Power Chain Saws" (01387-63-1)

E. Transparencies (Available from NASCO)
1. "The Life Cycle of Plants — Angiosperms"
2. "The Life Cycle of Seed Plants — Gymnosperms"
3. "Tree Growth"

FUTURE FARMERS OF AMERICA

I. Performance Objectives

Upon completion of the unit the student will be able to

A. Understand the relationship of FFA to agricultural education.
B. Be familiar with the history and development of the FFA organization.
C. Comprehend the structure and organization of the FFA.
D. Discuss the aims and purposes of the FFA.
E. Describe the requirements for FFA membership and degree qualifications.
F. Explain the duties and responsibilities of chapter members and officers.
G. Function effectively in chapter meetings as an officer or member.
H. List and discuss the essentials of a good chapter.
I. Help plan and implement a chapter program of work.
J. Assist in the planning and conducting of school and community youth meetings.
K. Function more effectively in public speaking activities.
L. Help plan and conduct an awards program or parent and member banquet.
M. Explain the FFA contests and awards program.
N. Develop a spirit of cooperation, a desire to be of service to others, and to prepare for useful citizenship.
O. Discuss local, state, and national activities.
P. Function as a leader in the chapter, school, and community.

Q. Develop a deeper understanding and appreciation for the American Flag and our American Heritage.
R. Select an agricultural career based on a comprehensive understandnig of the agriculture industry.
S. Develop and demonstrate a proficiency in the agriculture industry.
T. Use the agricultural occupation experience program to become established in his/her chosen agricultural occupation.

II. Concepts to Develop
A. FFA contributes significantly to the overall development of rural and urban youth alike.
B. FFA is intra-curricular with agricultural education.
C. FFA serves as a laboratory to "learn by doing" the many things taught in the classroom.
D. FFA seeks to develop in members the democratic style of leadership.
E. Awards are made available to members through the FFA foundation.
F. Every member involvement in chapter activities contributes to student interest and chapter achievement.
G. The development of public speaking skills enhances the effectiveness of a leader.
H. Goals and objectives are an important component of the yearly chapter program of work.
I. Contests provide members with the opportunity to demonstrate skills learned in the classroom and in occupational experience program activities.
J. Awards contribute significantly to student self concept and interest in the program.
K. The awards program recognizes proficiency in several areas in addition to farming.
L. Wholesome competition is a fundamental basis for progress.

III. Subject Matter to Teach
A. Agricultural education and the FFA
1. Relationship of FFA to agricultural education, Public Law 740.
2. Importance to the local school.
3. Chapter contributions to the school and community.
4. State and national associations.
B. History and development
1. Significance of the National Vocational Education Act.
2. Purposes of agricultural clubs prior to 1928.
3. Founders of the FFA.
4. Impact of early national livestock judging contests.
5. How the FFA became an organization.
6. Code of ethics.
7. Proper use of the official jacket.
C. Operation of the FFA organization
1. Symbols, emblem, and colors of the organization.
2. Financing and how the organization is governed.
3. Local, state, and national officers.
4. Role of adults in the organization.
5. Aims and purposes.
6. Motto and creed of the organization.
7. Dues structure.
8. Organizational chart.
9. Administrative chart.
D. Membership and degrees
1. Kinds of membership and policies.
2. Degrees of active membership and qualifications.
3. Pins and symbols.
E. Leadership
1. Styles of leadership.
2. Formal and informal leadership.
3. Qualities desired in a person.
4. Functions of democratic leadership.
5. Opportunities for development.
6. Role of local, state, and national organization in promoting leadership.
7. The importance of team work.
8. Specific officer duties.
9. Public relations and social graces.
10. Public speaking skills.
a. Selection of a subject.
b. Speech preparation.
c. Delivery.
d. Personal appearance.
e. Introductions.
f. Telephone and face to face conversation skills.
g. Proper breathing.
h. Pronunciation and enunciation.
i. Grammar usage.
F. Duties and responsibilities of FFA officers and members
1. Incentives to become a participating member.
2. Qualities of an effective member.
3. Qualities of an effective officer.
4. Human relations skills needed in working with others.
5. Duties of chapter officers.
6. Leadership activities for officers and members.
7. Officer responsibility in conducting program of activities and chapter meetings.
8. Chapter, state, and national officer qualifications.

9. Personal appearance, manners, behavior in public and code of ethics.

G. Planning and conducting chapter meeting
   1. Chapter equipment.
   2. Meeting room arrangement.
   3. Planning the agenda.
   4. Order of business.
   5. Responsibilities of members and officers.
   6. Opening and closing ceremony.
   7. Essentials of a chapter meeting.
   8. Minutes and financial records.
   9. Symbols of each office.

H. Chapter program of activities
   1. The executive committee.
   2. Guidelines in selecting activities.
   3. Planning a program of activities.
   4. Calendar of activities.
   5. National awards program for chapters.
   6. Program of activities, goals, ways and means.
   7. Skills needed to function effectively as a committee member.
   8. The value of committees.
   9. Responsibility of the chairman in carrying out activities.
   10. Responsibilities of committees in carrying out activities.
   11. Committees responsibility for evaluating activities.

I. National foundation and awards program
   1. Available contests.
   2. Value of participation.
   3. Developing student confidence.
   4. Basic levels of recognition given in the FFA.
   5. Relationship of the National FFA Foundation, Inc. to FFA.
   6. Objectives, eligibility, and sponsorship of each award.
   7. Past chapter contests and award achievement.
   8. Awards available for non-farm members.
   9. Means of raising award funds.

J. Parent and member banquet
   1. Reasons for holding a banquet.
   2. Member participation.
   3. Planning and conducting the banquet.
   4. Committee responsibilities.
   5. Role of the advisor in planning and conducting a banquet.
   6. Role of a state FFA officer.

K. National FFA activities and functions
   1. Functions conducted on the national level.
   2. Opportunities at the national level.
   3. National convention proceedings.
   4. National leadership and citizenship conference proceedings.
   5. Future Farmer Supply Service.
   6. The National Future Farmer Magazine.
   7. The official calendar.
   8. Reasons for state and national convention attendance.
   9. Career show at the national convention.
   10. International Education Programs.

L. The American Flag
   1. History and development of the American Flag.
   2. Proper Flag display.
   3. Respect for the American Flag.
   4. Handling the Flag.
   5. Proper way of pledging allegiance to the Flag.
   6. Official proportions of the American Flag.
   7. Laws governing the use and treatment of the Flag.
   8. Meaning of the stars and stripes and the three colors.
   9. Proper disposal of a worn out Flag.
   10. Reasons for flying a flag at half mast.

IV. Motivation

A. Chapter visits and presentation by state or national officer.
B. Bulletin board display.
C. Films, slides and filmstrips.
D. FFA scrapbook.
E. Field trips to former outstanding FFA members.
F. Display trophies and plaques won by the chapter in the classroom.
G. Former award winners speak to the class on the benefits of participating in the FFA contest and awards program.
H. Display FFA chapter supply catalogue.
I. Display award applications on the chapter bulletin board.
J. Prominently display official FFA magazine and the official FFA calendar.

V. Learning Activities

A. Class members develop a list of how FFA contributes to agricultural education objectives.
B. Class members develop a list showing the relationship between FFA contests and activities and various phases of vocational agriculture.
C. Students complete a leadership traits checklist.
D. Conduct a creed speaking contest.

E. Prepare an organizational chart to show how the FFA is governed.
F. Students review award applications.
G. Class presentation by an executive committee member on how to plan a meeting.
H. Class members demonstrate proper table manners and etiquette.
I. Hold a parliamentary procedure team contest.
J. Review state and national program of activities.
K. Develop a large chart of the chapter's program of activities and display it in the chapter room.
L. Use a tape recorder and allow each student to hear his/her FFA speech on tape.
M. Class members demonstrate proper use of the telephone.
N. Students practice making formal introductions.
O. Conduct a parent-member FFA banquet planning exercise.
P. Students demonstrate the proper method of folding the flag.

VI. Materials Needed

A. Books
1. *A More Effective FFA*. Wall. Interstate.
2. *Forward FFA*. W. A. Ross. Future Farmers Supply Service. Alexandria, Virginia 22309.
3. *Handbook on Speech for Future Farmers*. Purkey. Interstate.
4. *How to Hold a Better Meeting*. Snell. Harper & Brothers.
5. *Parliamentary Procedure*. Sturgis. McGraw-Hill Book Co.
6. *Practical Activities for Future Farmers*. Tenney. Interstate.
7. *Practical Parliamentary Procedure*. Cruzan. McKnight and McKnight.
8. *Programs for Future Farmer Chapter Meetings*. Tenney. Interstate.
9. *Public Speaking for Future Farmers*. Judson. Interstate.
10. *Robert's Rules of Order*. Available in most book stores.
11. *Speak With Ease*. Ross. National Farm Book Co.
12. *The FFA and You*. Bender, Clark and Taylor. Interstate.
13. *When You Preside*. Sutherland. Interstate.
14. *Your Opportunities in Vocational Agriculture*. Phipps. Interstate.

B. Periodicals or Manuals
1. *A Handbook for National FFA Officers*. Gray. National FFA Center, Alexandria, Va. 22309.
2. *A Handbook for Conducting FFA Meetings*. (Preliminary Parliamentary Procedure.) Russell. Interstate.
3. *FFA Official Manual*. Future Farmer Supply Service. Alexandria, Va. 22309
4. *Helps in Mastering Parliamentary Procedure*. Stewart. Coop. Print Shop, New Concord, Ohio.
5. *National Convention Proceedings*. National Executive Secretary, National FFA Center, Alexandria, Va. 22309.
6. *Now You're Talking*. Interstate.
7. *FFA At Work For Safety*. National FFA Center, Alexandria, Va. 22309.
8. *The Future Farmer Organization: What It Is - What It Does*. Future Farmer's Supply Service, Alexandria, Va. 22309.
9. *Vocational Agriculture - FFA*. Future Farmer's Supply Service, Alexandria, Va. 22309.
10. *Advisor's Handbook on Proficiency Awards*. National FFA Center. Alexandria, Va. 22309.

C. Pamphlets
1. "You and Your Flag." Channing L. Bete Co., Greenfield, Massachusetts.
2. "Awards For You." National FFA Center, Alexandria, Va. 22309.
3. "Discuss It, Plan It, Do It." Circular 445, Pennsylvania State University, University Park, Pa.
4. "Future Farmers of America Foundation Awards." National FFA Center.
5. "Leadership in Group Discussion." Gray. National FFA Center.
6. "Leadership of Youth Groups." Farmland Industries, Kansas City, Mo.
7. "So You Want To Be An Officer In The FFA." Bail. Bulletin 40, New York State College, Ithaca, NY.
8. "Pageant Script: History of Vocational Education." Gray. National FFA Center.
9. Pageant Script: "Our Forty Years." Gray. National FFA Center.
10. Pageant Script: "History of Old Glory." Gray. National FFA Center.
11. "Leadership and Citizenship Conferences." National FFA Center.

12. "International Education Information." National FFA Center.
13. Booklets Relating to Congress, Government, Communism, etc. Channing L. Bete Co., Greenfield, Massachusetts.
14. "I Am The American Flag." Gray. National FFA Center.

D. Films and Filmstrips
1. "FFA Stars Over America"
2. "BOAC"
3. "The Inheritors"
4. "Four Star Farmers"

Above films available from: Venard Films, Box 1332, Peoria, Illinois 61601

5. *"The How in Parliamentary Procedure."* Interstate.
6. Slide Series on FFA Operations. Update.

Series A – FFA Flexible and Relevant
Series B – Supervised Experience
Series C – Cooperation
Series D – Community Service (BOAC)
Series E – Leadership – What Is It?
Series F – Earnings and Savings (Fund raising)
Series G – Conduct of meetings
Series H – Scholarship
Series I – Recreation
Series J – Public Relations
Series K – State and National Activities
Series L – A Close Look at FFA National
Series M – FFA: Youth With A Purpose (Why Join FFA)

Order from: A. B. Cordes, Department of Public Instruction, 126 Langdon Street, Madison, Wisconsin 53702

GARDENING

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in gardening and will be able to relate these factors to his own specific needs and aspirations.

B. Identify the following parts of garden plants:

Stalk	Pith
Leaves	Node
Tassel	Internode
Taproot	Shank

C. List significant highlights of the history of food preservation.

D. Select varieties and seed for their particular locality.

E. Prepare a proper seedbed.

F. Select the proper kind of fertilizer. Discuss placement of fertilizer and application rates.

G. Properly plant a garden.

H. Use the proper chemicals for weed, disease, and insect control and also the proper cultivation methods.

I. Discuss the correct harvesting, storing, and marketing principles of vegetables.

J. Transplant various plants grown in the garden.

II. Concepts to Develop

A. There are career opportunities in gardening for young men and women at all levels of educational preparation.

B. Vegetable gardens provide a variety of tasty and healthful foods.

C. A family vegetable garden may substantially lower the food budget.

D. Selecting adapted vegetable varieties is important.

E. Approved practices must be followed if successful vegetable gardening is to be achieved.

F. Various techniques are utilized in the harvesting, storing, and marketing of vegetable crops.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. The Vegetable industry
1. Physical factors and requirements.
2. Other factors and requirements.
3. Scope and importance.
4. The changing vegetable industry.

C. Classifying vegetables
1. Botanical families and crop use.
2. Adaptation to heat and cold.

3. Season of growth of vegetables.

D. Plant growth and development
   1. Making of cells.
   2. Enlarging of cells.
   3. Maturing of cells.
   4. Water influence on the vegative-reproductive phases of growth.
   5. Light influence on the vegative-reproductive phases of growth.
   6. Temperature influence on growth.

E. Breeding and improving vegetables
   1. Cells and chromosomes, and genes.
   2. Segregation and recombination.
   3. Flowers, pollination and fertilization.
   4. Variation.
   5. Methods of improvement.
   6. Plants naturally self-pollinated.
   7. Plants naturally cross-pollinated.
   8. Plants partially cross-pollinated.
   9. Plants vegetatively propagated.

F. Seeds and seed growing
   1. The characters of good seed.
   2. Classification of vegetables.
   3. Vegetable trials.
   4. The seed business.
   5. Buying seed.
   6. Growing seed.

G. Managing soils and fertilizing
   1. Choosing soils for vegetables.
   2. Conserving soil and moisture.
   3. Preparing the soil.
   4. Choosing the soil reaction.
   5. Controlling the soil reaction.
   6. Maintaining organic matter.
   7. Using commercial fertilizers.
   8. Determining fertilizer requirements.

H. Growing plants, hardening, and transplanting
   1. Plant-growing structures.
   2. Growing plants.
   3. Transplanting.
   4. Hardening plants.

I. Planting in the open
   1. Planting seed.
   2. Transplanting.

J. Weed control
   1. Cultivating.
   2. Controlling weeds with chemicals.
   3. Rotation of vegetable crops.

K. Irrigation and mulching
   1. Purpose.
   2. Method.

L. Insects and diseases
   1. Controlling insects.
   2. Controlling diseases of vegetables.
   3. Fungicides used in vegetable production.
   4. Safe handling of insecticides and fungicides.

M. Storing vegetables
   1. Requirements.
   2. Methods and structures.

N. Harvesting, handling, and marketing
   1. Harvesting methods.
   2. Preparing for market.
   3. Harvesting and handling equipment.
   4. Cooperative marketing associations.
   5. Transporting.
   6. Marketing methods.
   7. Retailing practices and trends.
   8. Exporting and importing.
   9. Federal-state marketing services.

IV. Motivation

A. Field trip to truck garden and selected home gardens.
B. Factory employer class presentation.
C. Bulletin board display.
D. Films, filmstrips and slides.

V. Learning Activities

A. Management in the design of a garden.
B. Identify common garden seeds.
C. Planting a garden designed by students.
D. Plant and manage the family garden.
E. Demonstrate proper harvesting and storing of garden produce.

VI. Materials Needed

A. Books, Bulletins and Pamphlets
   1. Bush & Brown. *America's Garden Book*. 1965
   2. McCall. *McCall's Garden Book*. 1968
   3. Sunset & Lane. *Basic Gardening*.
   4. University of Wisconsin-Extension. *Commercial Vegetable Produce*. A23-70. 1973.
   5. Ware & McCollum. *Produce Vegetable Crops*. Interstate. 1968

B. Films and Filmstrips
   1. "Grading Vegetables." Part I and II. NASCO.
   2. "Hit Early Vegetable Market with Plastic Covers." J. Deere.
   3. "The Insects." Set of 4. NASCO.
   4. "Now is the Time." Modern Talking Pictures.
   5. "Vegetables." VEP. California State Polytechnic. San Luis, Obispo, California.
   6. "Weed Identification." NASCO.

HAY CROPS, LEGUME

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the production of legume hay crops and plant science and will be able to relate these factors to his/her own specific needs and aspirations.
B. Contrast the protein content and yield of legumes and non-legumes.
C. Discuss the climatic and soil requirements of legumes.
D. Compare the seeding rates of the various legume hay crops.
E. Contrast the plant characteristics of legumes grown in the area.
F. Discuss management practices which result in high yields and longevity of the crop.
G. Contrast the suitability of commonly grown legume crops for hay, pasture, silage and green manure.
H. List and discuss the varieties of legumes available to area farmers.
I. Choose varieties of the various species of legumes with the best performance potential for the area.
J. Explain the procedure and benefits derived from inoculating legumes.
K. Describe the characteristics of a good seedbed.
L. Contrast plant food deficiency symptoms.
M. List and compare seeding methods.
N. Comprehend the reasons for depth of seeding of the various legume species.
O. List and explain the causes and practices which can be used to reduce winterkilling.
P. Describe the relationship between crop maturity and nutritive value.
Q. Explain recommended management practices.
R. Discuss conditions which favor a good yield of seed.
S. Contrast harvesting methods of legume crops.
T. Describe the symptoms and measures used in controlling the diseases of legume hay crops.
U. Discuss the characteristics, the damage caused and select effective insect control measures.

II. Concepts to Develop

A. There are career opportunities in plant science and crop production for young men and women at all levels of educational preparation.
B. Legumes grow best on soils which are neutral or slightly alkaline.
C. Legumes can be grown under widely varying climatic conditions.
D. Varieties differ in their resistance, cold tolerance and seed production.
E. Inoculation of legumes helps to assure healthy stands.
F. A firm seedbed is essential for good germination of legume seed.
G. Overworking the seedbed is a very undesirable practice.
H. Legumes respond significantly to applications of lime and fertilizers.
I. Trace elements are needed for normal growth of legumes.
J. Luxury feeding is an unwise practice.
K. Shallow seeding contributes to a good stand of legumes.
L. A corrugated roller seeder is an efficient and effective implement to use in planting small seeded legumes.
M. Seeding rates of legume species vary considerably.
N. Proper management of legumes contributes to high yields and longevity of the crop.
O. Pollinating insects play an important role in the production of legume seed.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Importance and distribution
   1. Origin of the crop.
   2. Area where grown.
   3. Present acreage and trends.
   4. Reasons for its popularity.
   5. Disadvantages of each species of legumes.

C. Characteristics
   1. Plant description - height, hardiness, longevity, leaf and root characteristics.

D. Soil and climate requirements
   1. Fertility needs.
   2. Type of soil, depth, drainage, sensisivity to acid.
   3. Range of climatic conditions.
   4. Moisture requirements.

E. Selecting the seed
   1. Varieties of each legume specie.
   2. Varietal differences with respect to yield, habit of growth, quality of hay, resistance to cold, drought, and disease resistance.
   3. Origin of seed and its importance.
   4. Characteristics of certified seed.

F. Culture of legumes
   1. Reasons for inoculating legumes.
   2. Preparation of the seedbed.
      a. Characteristics of a good seedbed.
      b. Implement to use in preparing the seedbed.
   3. Soil acidity, its effect on the establishment and yields of legumes.
   4. Proper pH level and materials to use for correcting acidity.
   5. Soil sampling and testing.
   6. Kind and amount of fertilizer to apply.
   7. The importance of trace elements.
   8. Method and time of sowing.
   9. Rate and depth of sowing.
   10. Plant food deficiency symptoms.
   11. Methods of harvesting and maintaining crop quality.

G. Management of legumes
   1. Hay production - number of cuttings and when to cut.
   2. Plant maturity relationships.
   3. Pasture production - time and extent of grazing.
   4. Reducing the danger of bloat.
   5. The fertility program and its relationship to yield and longevity of stands.
   6. Winter killing - its causes and practices used to reduce losses.

H. Diseases
   1. Cause.
   2. Symptoms.
   3. Prevention.
   4. Control measures.

I. Insects
   1. Characteristics of the insect.
   2. Method of injuring the plant.
   3. Symptoms of the injured plant.
   4. Control measures.

IV. Motivation

A. Films, filmstrips and slides.
B. Charts.
C. Bulletin board displays.
D. Field trips to area farms.

V. Learning Activities

A. Occupational experience program including all phases of production.
B. Prepare mounts of crop and seed specimens.
C. Collect and prepare mounts of plants damaged by insects.
D. Collect and prepare mounts of diseased plants.
E. Collect root specimens of legumes.
F. Perform germination tests.
G. Collect, identify and prepare mounts of leaf specimens.

VI. Materials Needed

A. Books
   1. Bear, et al. *Hunger Signs in Crops.* American Society of Agronomy, Washington, D. C. 1949.
   2. Brickbauer & Mortenson. *Approved Practices in Crop Production.* Interstate. 1967.
   3. Delorit & Ahlgren. *Crop Production.* 4th ed. Prentice-Hall, 1973.
   4. Hughes, Henson, Metcalfe & Johnson. *Crop Production.* MacMillan Company. 1957.
   5. Hughes, Heath, & Metcalfe. *Forages.* Iowa State College Press. Ames, Iowa. 1951.
   6. Wilson & Richter. *Producing Farm Crops.* National Farm Book Co., Omro, Wisconsin. 1960.

B. Bulletins
   1. Forages - University of Wisconsin - Extension.
      A2477, "Grow Legumes for Green Manure"
      A2363, "Birdsfoot Trefoil"
      R2214, "Forage Quality of Vernal and DuPuits Alfalfa" (RR 73)
      R2189, "Performance of Birdsfoot Trefoil in Northern Wisconsin (RR 64)
      A1860, "Red Clover Varieties in Wisconsin" (SC 77)
      A1683, "Alfalfa Varieties for Wisconsin"
      R1495, "A Half Century of Alfalfa in Wisconsin" (B 502)
      A1239, "Ladino Clover for Better Pastures" (C 367)

2. Forage Production - University of Wisconsin-Extension.
   - R2480, "Influence of Alfalfa Stand Patterns and Nitrogen Fertilization on the Yield and Persistence of Grasses Grown with Alfalfa"
   - R2448, "Alfalfa Fertilization"
   - R1988, "The Performance of Vernal and Dupuits Alfalfa Harvested at First Flower or Three Times by Date" (RR 23)
   - A1884, "Cut on Time and Fertilize for Quality Alfalfa" (SC 84)
   - A1882, "Establish a Good Stand for Top Quality Alfalfa" (SC 82)
   - R1779, "Changes in Micronutrient Composition of the Herbage of Alfalfa, Medium Red Clover, Ladino Clover, and Bromegrass with Advance in Maturity" (RR 4)
   - R1332, "Innoculate Legumes, it Pays" (B 484)
   - A1102, "Safeguard the New Seedings" (C 300)
   - FB2003A, "Legume Innoculation - What It Is - What It Does"
3. Forage Protection - University of Wisconsin - Extension.
   - R2201, "Alfalfa Mosiac, The Disease and Its Virus Incitant" (RB 280)
   - A2156, "Check Alfalfa Regularly for Major Insect Pests"
   - A1883, "Control Insects and Diseases for Top Quality Alfalfa" (SC 83)
4. Forage Utilization - University of Wisconsin - Extension.
   - R2378, "Evaluation of Alfalfa-Brome Forage Harvested Two and Three Times Annually, Stored as Low-Moisture Silage and Fed to Lactating Dairy Cows."
   - A1881, "Improve Your Income With Quality Alfalfa" (SC 81)

C. Films — BAVI

1.	"Alfalfa Story"	5460
2.	"Establishing Alfalfa"	3630
3.	"Let's Make Quality Forage"	2804

HAY CROPS, NON-LEGUME

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the production of non-legume hay crops and plant science and will be able to relate these factors to his/her own specific needs and aspirations.
B. Compare the protein content and yields of non-legume and legume hay crops.
C. Describe the climate and soil requirements of non-legumes.
D. Contrast the seeding rate of several non-legume hay crops.
E. Explain the plant characteristics of non-legume hay crops grown in this area.
F. Contrast the suitability of commonly grown non-legume crops for hay, pasture, silage, and green manure.
G. Discuss the species of non-legume hay crops which are commonly grown in the area.
H. Select varieties of the various species of non-legumes which are commonly grown for hay and have the best yield potential.
I. List and discuss the characteristics of a good seedbed.
J. Recognize plant food deficiency symptoms in non-legume hay crops.
K. List and compare seeding methods.
L. Explain the relationship between crop maturity and nutritive value.
M. Describe recommended management practices which result in the production of high yields and longevity of stands.
N. Describe conditions which favor a good yield of seed.
O. Discuss the relative importance of disease and insects in the production of non-legume hay crops.

II. Concepts to Develop

A. There are career opportunities in plant science and crop production for young men and women at all levels of educational preparation.
B. Non-legume hay crops are often poorly managed.

C. Some non-legume hay crops are more productive when grown with a legume.
D. A cultipacker seeder does an excellent job of seeding non-legume hay crops.
E. Non-legume hay crops grow best on fertile, well drained soils.
F. Proper fertilization is necessary for the establishment and maintenance of good stands of non-legumes.
G. Non-legume hay crops may also be used for pasture and silage.
H. A firm seedbed is essential for good germination.
I. Seeding rates of non-legumes vary.
J. Luxury feeding is an unwise practice.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Importance and distribution
1. Origin of the species.
2. Areas where grown.
3. Present acreage and trends.
4. Reason for its popularity.
5. Disadvantages of the various species of non-legumes grown for hay.

C. Characteristics
1. Plant description - height, hardiness, longevity, leaf and root characteristics.

D. Soil and climate requirements
1. Type of soil.
2. Soil drainage and its effect on plant growth.
3. Fertility needs.
4. Temperature and moisture conditions.

E. Crop culture
1. Time of sowing.
2. Use of companion crops.
3. Seeding mixtures.
4. Rate of seeding.
5. Depth of seeding.
6. Fertilization - rates of application and kinds of fertilizer used.
7. Preparation of the seedbed.
8. Plant food deficiency symptoms.

F. Uses of the crop
1. Hay production.
a. Management practices.
2. Pasture production.
a. Management practices.
3. Silage.
a. Relative value.
4. Seed production.
a. Where produced.
b. Method of harvesting.
c. Care in harvesting.

G. Diseases
1. Relative importance.
2. Extent of damage to the plant.
3. Control measures.

H. Insects
1. Relative importance.
2. Damage to the plant.
3. Control measures.

IV. Motivation

A. Films, filmstrips and slides.
B. Charts.
C. Bulletin board displays.
D. Field trips to area farms.

V. Learning Activities

A. Occupational experience program including all phases of production.
B. Prepare mounts of crop and seed specimens.
C. Prepare mounts of diseased plants.
D. Collect root specimens of non-legume hay crops.
E. Perform germination tests.
F. Collect, identify and prepare an exhibit of leaf specimens.

VI. Materials Needed

A. Books
1. Bear, et al. *Hunger Signs in Crops.* American Society of Agronomy, Washington, D.C. 1949.
2. Brickbauer & Mortenson. *Approved Practices in Crop Production.* Interstate. 1967.
3. Delorit & Ahlgren. *Crop Production.* 4th ed. Prentice-Hall, 1973.
4. Hughes, Henson, Metcalfe & Johnson. *Crop Production.* MacMillan Company. 1957.
5. Hughes, Heath, & Metcalfe. *Forages.* Iowa State College Press. 1951.
6. Wilson & Richter. *Producing Farm Crops.* National Farm Book Co., 1960.

B. Bulletins
1. *Forages* — University of Wisconsin-Extension.
A2216, "Verdant Timothy" (SC 154)
A2042, "Sac Smooth Bromegrass - A New Bromegrass for the Midwest"
A1928, "Sudan Grass and Other Sorghums for Forage (C 638)

A1828, "Growing Orchardgrass in Wisconsin" (SC 70)
A1827, "Identifying Grasses in Wisconsin Turf" (SC 69)
A1696, "Brome Grass (C563)
FB2241A, "Sudangrass and Sorghums—Sudangrass Hybrids for Forage"

2. *Forage Production*
R2384, "Influence of Nitrogen Fertilization on the Performance of an Alfalfa-Bromegrass and Bromegrass Grown Alone"
A2368, "Put Power in Your Pasture with Nitrogen"
R2196, "Performance of Bromegrass, Orchardgrass and Reed Canary Grass Grown at Five Nitrogen Levels and with Alfalfa" (RR 69)
R2190, "Pasture Renovation in Southwestern Wisconsin" (RR65)
R1966, "Response to Kentucky Bluegrass (Poa Pratensis L. Strains to Fertility and Management" (RR 20)
A1525, "Forage Crop Varieties and Seeding Mixtures"

3. *Forage Utilization*
R2251, "A Comparison of Haylage and Wilted Grass Silage plus Hay in Dairy Cow Diet" (RR 78)

C. Films
1. "Grass — The Big Story," 2946. BAVI
2. "Grass Roots in the Soil," 3537. BA[illegible]

HORSE SCIENCE

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in horse science and production and will be able to relate these factors to his/her own specific needs and aspirations.
B. Have an understanding of the history of the horse and the horse industry.
C. Analyze the uses and functions of the horse in the modern world.
D. Perform basic stable management practices, such as: record keeping, grooming, feeding, hoof trimming, parasite control, etc.
E. Write proper descriptions of a horse's color and markings for registration purposes.
F. Use basic horse terminology and anatomy.
G. Develop a basic skill in judging halter and equitation classes.
H. List different types, correct use, and proper care of horse equipment.
I. Be able to perform basic training practices for horses at halter or under saddle.
J. Know the approximate cost of owning and stabling a horse.

II. Concepts to Develop

A. There are career opportunities in horse science and production for young men and women at all levels of educational preparation.
B. The horse has performed many functions for man throughout its history of domestication.
C. Basic stable management practices such as training, feeding, grooming and record keeping are important parts of horse science.
D. Registration procedures are determined by national breed associations.
E. Horses can be differentiated by quality through the development of judging skill.
F. Horsemen use correct terminology.
G. Each piece of equipment is designed for a specific purpose and must be used properly.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. History and development of the horse industry
1. The evolution of the horse.
2. Modern breeds of horses.

C. The anatomy of the horse
   1. Bone structure.
   2. Judging horses.
   3. Age and height of horses.
   4. Unsoundness and blemishes.
   5. Action of the horse.

D. Breeds and uses of different types of horses
   1. Light horses.
      a. ponies (less than 56 inches).
      a. horses (greater than 56 inches).
   2. Draft horses, mules, and donkeys.

E. Breeding horses
   1. Genetics.
   2. Mating procedures.
   3. Parturition.
   4. Artificial insemination.

F. Feeding horses
   1. Digestive system.
   2. Composition of feed stuffs.
   3. Developing rations.

G. Building and equipment storage
   1. Types of structure.
   2. Costs of structure.

H. Disease and parasite control
   1. Types of diseases and parasites.
   2. Cause, prevention, and treatment.

I. Horsemanship
   1. Handling the horse.
   2. Proper type and care of equipment.
   3. Basic riding and driving tips.
   4. Grooming and care of horses.
   5. Management tips.
   6. Costs of owning a horse.

IV. Motivation

A. Field trips to various stables.

B. Demonstrations of proper management practices.

C. Breed films and slides.

D. Attend a horse show.

E. Bulletin Board displays.

V. Learning Activities

A. Occupational experience programs.

B. Students do a paper on costs of owning a horse, equipment, and stabling for one year.

C. Students do research on their favorite breed of horse.

D. Demonstrations on management practices or equitation.

VI. Materials Needed

A. Books

1. Ball. *Saddle Up.* Farm Journal. 1970.
2. Ensminger. *Horses and Horsemanship.* Interstate. 1969.
3. Ensminger. *Horses! Horses! Horses!* Pegasus Co.
4. Ensminger. *Tack! Tack! Tack!* Pegasus Co.
5. Gorman. *The Western Horse.* Interstate. 1967.
6. Hayes. *Points of the Horse.* Arco Publishing. 1969.
7. Jones and Bogart. *Genetics of the Horse.* Edward Brothers. 1971.
8. Kays. The *Horse.* A. S. Barnes. 1969.
9. Patten. *The Light Horse Breeds.* A. S. Barnes. 1960.
10. Williamson. *Breaking and Training the Stock Horse.* Caxton Printers. 1971.

B. Periodicals

1. *Horse & Rider*, Govina, Calif.
2. *The Draft Horse Journal*, Waterloo, Iowa
3. *The Western Horseman*, Colorado Springs, Colorado

C. Pamphlets & Breed Information From Associations

1. American Appaloosa Association, Inc.
   6471 East Lancaster, Fort Worth 12, Texas
2. American Hackney Horse Society
   527 Madison Ave. New York 27, New York
3. American Indian Horse Registry, Inc. Box 949, Blythe, California
4. American Part-Blooded Horse Registry
   2073 S. W. Park Ave. Portland 1, Oregon
5. American Paint Quarter Horse Association
   104 Citizen's National Bank, Abilene, Texas
6. American Paint Stock Horse Association
   623 South Henderson Street, Fort Worth, Texas
7. American Quarter Horse Association
   2736 West 10th, Amarillo, Texas
8. American Saddle Horse Breeder's Association
   929 South 4th Street, Louisville, Kentucky
9. American Shetland Pony Club
   Box 1250 Lafayette, Indiana
10. American Shire Horses Association
    Box 421, Olympia, Washington
11. American Suffolk Horse Association
    Box 421, Olympia, Washington
12. Appaloosa Horse Club, Inc.
    Box 403, Moscow, Idaho
13. Arabian Horse Club Registry of America, Inc.
    332 South Michigan Ave., Chicago, Illinois 60604

14. Belgian Draft Horse Corporation of America
    Box 353, Wabash, Indiana
15. Buckskin Registry Association
    Box 772, Anderson, California
16. Chickasaw Horse Association, Inc.
    Love Valley, Statesville, North Carolina
17. Clydesdale Breeder's Association of the United States
    Batavia, Iowa.
18. Galiceno Horse Breeder's Association
    711 People's Bank, Tyler, Texas
19. Half-Arab and Anglo-Arab Registry
    224 East Olive Ave., Burbank, California
20. Icelandic Pony Club and Registry, Inc.
    56 Alles Acres, Greeley, Colorado
21. International Arabian Horse Association
    224 East Olive Ave., Burbank, California
22. Morgan Horse Club, Inc.
    Box 2157, West Hartford 17, Connecticut
23. Palomino Horse Association, Inc.
    22049 Devonshire Street, Chatsworth, California
24. Palomino Horse Breeders of America, Inc.
    Box 249, Mineral Wells, Texas
25. Percheron Horse Association of America
    R. No. 1, Fair Oaks, Indiana
26. Pinto Horse Association of America, Inc.
    R. No. 1, Box 155, Ellington, Connecticut
27. Pony of America Club, Inc.
    31 First Street, N. E. Mason City, Iowa
28. Spanish Mustang Registry, Inc.
    Box 148, Lewisburg, Tennessee
29. Tennessee Walking Horse Breeder's and Exhibiter's Association of America
    Box 87, Lewisburg, Tennessee
30. The America Albino Horse Club, Inc.
    Box 79, Crabtree, Oregon
31. The American Gotland Horse Association
    110 East Parkway, Columbia, Missouri
32. The Jockey Club
    300 Park Avenue, New York, New York 10022
33. The Missouri Fox Trotting Horse Breed Association, Inc.
    Ava, Missouri
34. The National Quarter Horse Registry, Inc.
    Raywood, Texas
35. United States Trotting Association
    Columbus 15, Ohio
36. Welsh Pony Society of America, Inc.
    Box 419 B, Unionville, Pennsylvania

D. Slides
1. "The Skill of Horseshoeing"
2. "Bits and Bitting"
3. "Bridles and Bridling"
4. "Haltering and Tying"
5. "Pleasure Trail Riding"
6. "Color and Color Inheritance"
7. "Horse Nutrition"
8. "Catching and Leading"
9. "Impact of the Horse on the U. S. Economy"
10. "Horse Safety"

Slides available from: Bill J. Pierick, Youth Development, 610 Langdon Street, Madison, WI 53706.

May Purchase Slides From: Animal Science Dept., S. W. Sabin, 132 Morris Hall, Cornell Univ., Ithica, New York 14850.

Films

1. Breeds and Origin of the Horse
   a. "The Horse in North America." No. 2997, BAVI
   b. "The Horse America Made." American Saddle Horse Breeders Association.
   c. "The Registered American Shetland Pony." American Shetland Pony Club. Lafayette, Indiana.
   d. "Shetlands Can Live Anywhere." American Shetland Pony Club.
   e. "Kids and Shetlands." American Shetland Pony Club.
   f. "Introduction to the Arabian Horse." RCA's Films.
   g. "Arabians Are Fun." RCA's Films.
   h. "The Appaloosa Horse." Murray Deattly Film Productions. 9000 Sunset Boulevard. Los Angeles, California.
   i. "The Morgan Horse." The Morgan Horse Club, Inc.
   j. "Ride Cowboy Ride." No. 1010 and 1011. BAVI
   k. "Off and Running." No. 0966. BAVI
   l. "Quarter Horse at Halter, Roping, Cutting and Reining." No. 0961. BAVI
   m. "The Proud Breed." RCA's Films.

2. Selection and Care
   a. "Horseshoeing." BAVI
   b. "Horses and Bets." USDA
   c. "Greentree Thoroughbred." Animal Husbandry Department. Washington State University, Pullman, Washington.
   d. "Introduction to Conformation." American Shetland Pony Club.

3. Fitting and Training
   a. "Horses' Gaits." RCA's Films.
   b. "Kids and Kolts." RCA's Films.
   c. "Horse Sense." BAVI
   d. "A Diamond in the Rough." American Shetland Pony Club. Lafayette, Ind.
   e. "4-H Horsemanship." RCA's Films.
   f. "Horsemanship; Youth and the Quarter Horse." No. 0951 and and 0952. BAVI
   g. "Horsemanship, Mr. Decathlon." No. 6307. BAVI
   h. "Basic Grooming." Appaloosa Horse Club, Inc.
   i. "Saddle Seat Equitation." American Horse Shows Equitation.
   j. "Stock Seat Equitation." American Horse Shows Association.
   k. "Hunt Seat Equitation." American Horse Shows Association.
   l. "They're off and Running." BAVI

HUMAN RELATIONS (UNIT 1)

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Explain how a person's values can affect his or her performance on a job.
B. Evaluate his/her interests by completing an interest inventory.
C. Define the terms: interest, aptitude, and ability.
D. Differentiate between a mental aptitude and a physical aptitude.
E. Recall the three types of mental aptitudes.
F. Define the term personality.
G. List and discuss personality traits.
H. Know why personality traits are important for success on the job.
I. Design a program to improve your personality.
J. Distinguish between an optimist and a pessimist.
K. Evaluate your attitudes by completing an attitudinal inventory.
L. Identify and describe twelve qualities that women most admire in men.
M. Identify and describe twelve qualities that men most admire in women.
N. Judge when a person is most likely to be in a receptive mood, based on criteria discussed in class.

II. Concepts to Develop

A. A person's values significantly affect his/her performance on the job.
B. Personality traits directly affect a person's success on the job.
C. The possession of certain characteristics play a vital role in a person's acceptance by the opposite sex.

III. Subject Matter to Teach

A. Values and their affect on our lives and jobs.

B. Personal traits and their influence on job performance.
   1. Interest.
   2. Mental aptitude.
   3. Physical aptitude.

C. Personality and its affect on our lives and jobs.
   1. Traits
      a. Attitude
      b. Courtesy
      c. Dependability
      d. Desire to succeed
      e. Enthusiasm
      f. Foresight
      g. Friendliness
      h. Health
      i. Honesty
      j. Initiative
      k. Loyalty
      l. Morality
      m. Neatness
      n. Open mindedness
      o. Personal appearance
      p. Punctuality
      q. Sense of humor
      r. Self control
      s. Tact
      t. Use of voice
   2. Ways of improving your personality.

D. Qualities of people and personal effectiveness.
   1. Qualities of women that men admire.
   2. Qualities of men that women admire.

3. Ways of sizing up a person.
4. Pet peeves.

IV. Motivation

A. Films, slides and filmstrips.
B. Resource persons speak to class.
C. Field trips to agribusiness firms.
D. Former students report their experiences obtained in the world of work.

V. Learning Activities

A. Complete an aptitude inventory.
B. Complete an interest inventory.
C. Complete a checklist personality inventory.
D. Participate in interviews with a personnel manager, union steward, union official, supervisors, etc.
E. Occupational experience programs.

HUMAN RELATIONS (UNIT 2)

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. List five employment qualifications.
B. Discuss the qualifications needed for entry into a job cluster.
C. Compare his/her employment qualifications with the qualifications needed for five occupations.
D. List twelve different sources of job opportunities.
E. Identify three benefits one may receive from part-time employment.
F. List and discuss the eleven points emphasized in *Succeeding in the World of Work* for filling out application forms.
G. Fill out job application forms.
H. Construct a letter of application for a job.
I. Be familiar with the components of a personal data sheet.
J. Develop your own personal data sheet.
K. Present orally the purposes of an interview and how you prepare for an interview.
L. Conduct an interview.

II. Concepts to Develop

A. Personal qualifications and interests should be matched with the career opportunities being sought.
B. Part-time employment is an asset when seeking full or future employment.
C. A properly written letter of application contributes to a person's success in the job market.
D. Certain skills are needed if one is to participate in a successful interview.

III. Subject Matter to Teach

A. Matching a person's employment qualifications with career requirements
   1. A person's first job.
   2. Job families.
   3. Comparison of careers.
B. Locating a job
   1. Sources of job opportunities and the value of each one.
C. Part-time employment and its relationship to future employment.
   1. Value of part-time work when seeking full-time employment.
   2. Value of "test-out" and transition from school to work.
D. Application forms
   1. Characteristics of properly completed forms.
E. Personal data sheets
   1. Components of the resume
F. Process of interviewing for a job
   1. Items which a person should take to the interview.
   2. Personal appearance.
   3. Knowledge of the company — or business-interviewee.
   4. Reasons why you are interested in working for the company which is conducting the interview.
   5. Personal preparation for anticipated questions.
   6. Reasons why some persons fail to favorably impress an interviewer.

IV. Motivation

A. Films, slides, and filmstrips.
B. Guest speakers.
C. Field trips to agribusiness firms.
D. Former students report on experiences from the world of work.

V. Learning Activities

A. Fill out job applications.
B. Write letters of application and submit to the instructor for evaluation.
C. Fill out a personal data sheet.

HUMAN RELATIONS (UNIT 3)

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. List and discuss eight attitudes which an employer desires in his employees and six attitudes an employee desires in his employer.

B. Describe attitudes employers do *not* desire in their employee and four attitudes employees do *not* desire in their employers.

C. Describe the abilities, skills, and attitudes necessary for employment in a job of your choice.

D. Discuss at least three factors which are necessary for good relationships among co-workers.

E. Identify the major causes of a given co-worker relationship problem and be able to suggest possible solutions.

F. Describe how unions and professional organizations are organized and how they function.

G. List and discuss what you believe are five advantages and five disadvantages of unions and professional organizations.

H. Select the better qualified of two individuals for a given job when given a set of criteria.

I. Develop a set of criteria an employer could use for promoting an employee.

J. List and explain the duties and responsibilities of a job supervisor.

K. Describe the various methods of terminating a job.

II. Concepts to Develop

A. Good rapport with one's fellow workers contributes to production efficiency.

B. Attitudes play an important role in employee-employer relationships.

C. Affiliation with a union or a professional organization affords its membership with numerous benefits.

III. Subject Matter to Teach

A. Attitude expectations of employers and employees.

1. Define
   a. Employer.
   b. Employee.
   c. Persistence.
   d. Enthusiasm.
2. Factors relating to success on the job.
3. Positive attitudes exhibited by employees.
4. Negative attitudes exhibited by employees.
5. Favorable and unfavorable attitudes possessed by employers as viewed by employees.

B. Importance of getting along with co-workers to maximize production efficiency.

1. Factors which promote good relationships.

C. Influence of unions and professional people on an individual's employment status.

1. Define
   a. Foreman.
   b. Collective bargaining.
   c. Negotiations.
   d. Job security.
   e. Unemployment compensation.
   f. Picket line.
   g. Mediation.
   h. Apprenticeship.
2. Advantages and disadvantages of Union membership.

IV. Motivation

A. Films, filmstrips, and slides.

B. Guest speakers.

C. Field trips to agribusiness firms.

D. Former students report experiences from the world of work.

V. Learning Activities

A. Review union and professional organization literature to determine its organizational structure.

B. Compile a list of union and professional organizations available to employees in the area.

C. Look at studies to become familiar with duties and responsibilities of supervisors.

D. Write letters of resignation and submit to the instructor for his/her evaluation.

VI. Materials Needed

A. Books

1. Binkley. *Course of Study in Non-Farm Agricultural Occupations.* University of Kentucky, Lexington. 1965.
2. Brogden. *Developing Communication Skills in Non-Committed Learners.* Parker Publishing Company, West Nyack, New York. 1970.
3. Clark & Sloan. *Classrooms in the Factories.* New York University Press, New York. 1958.

4. *Dictionary of Occupational Titles Volume I and II.* Department of Labor. Current Edition.
5. *Four Methods of Doing Business-Instructor's Guide.* Farmers Regional Cooperatives, Fort Dodge, Iowa. 1968.
6. Goldstein & Stark. *Entering the Labor Force.* Holt, Rinehart, and Winston, Inc. 1964.
7. Hemp & Krebs. *A Study Guide for Placement—Employment Programs in Agricultural Business and Industry.* Interstate.
8. Hopke. *Encyclopedia of Careers and Vocational Guidance.* Volume I and II. Doubleday.
9. Humphry. *Essential Aspects of Career Planning and Development.* Interstate.
10. Joseph. *Career Outdoors.* Thomas Nelson and Sons, Camden, New Jersey.
11. Kimbrell & Vineyard. *Succeeding in the World of Work.* McKnight and McKnight Publishing Company. 1970.
12. Mager. *Preparing Instruction Objectives.* Fearon Publishers.
13. Mager & Beach. *Developing Vocational Instruction.* Fearon Publishers.
14. Rathos, Harmon & Simon. *Values and Teaching: Working With Values in the Classroom.* Merrill Publishing, 1966.
15. Roy. *Exploring Agribusiness.* Interstate. 1967.
16. Stone. *Careers in Agribusiness and Industry.* Interstate.
17. Strong. *Industrial Labor and Community Relations.* Delmar Publishers, Albany, New York.

B. Pamphlets

1. Belman. "My Career Guidebook." Bruce Publishing Co. 1967.
2. Clark & McCarley. "A Pattern for Individualized Instruction in Vocational Agricultural Classes." Michigan State University, East Lansing, Michigan, 1968.
3. Dreese. "How to Fit the Job." Science Research Associates. Chicago, Illinois. 1960.
4. "An Employer's Guide to On-the-Job Training Under the Manpower Development and Training Act." U.S. Government Printing Office. Washington, D. C. 1966.
5. Fleming. "Your Days of Decision: What Do You Want To Do With Your Life?" National Farmer's Union, Denver, Colorado. 1964.
6. — — — Your World of Work: "How to Find Your Way In It." National Farmer's Union, 1965.
7. "Four Methods of Doing Business." Farmers Regional Cooperative. Fort Dodge, Iowa. 1968.
8. Hemp & Williams. "Research Related to the Disadvantaged and Research Strategies for the Seventies." University of Illinois-Urbana. July 1969.
9. Hudson & Weaver. "Succeeding At Work: Section 3: Learning More About Your Job." United Transparencies Inc. Binghamton, New York.
10. Hudson & Weaver. "Succeeding At Work: Section 4: Following Rules."
11. — — — "Succeeding At Work:" Section 5: Keeping Safe At Work. United Transparencies.
12. — — — "Succeeding At Work: Section 6: Keeping Healthy At Work." United Transparencies.
13. — — — "Succeeding At Work: Section 7: Taking a Vacation." United Transparencies.
14. "Human Relations in Agricultural Occupations." Ohio State University. Columbus, Ohio. 1965.
15. "Introducing Agricultural Career Experience." Kansas State University, Manhattan, Kansas. 1969.
16. Jaworski, et al. "Careers in Agriculture." Wisconsin Department of Public Instruction. 126 Langdon St., Madison, Wisconsin.
17. Kissinger & Drier. "Teacher's Guide: Vocational Guidance." Wisconsin Department of Public Instruction.
18. Menninger. "Growing Up Emotionally." Science Research Associates. Chicago, Illinois.
19. Moyniham, Daeger & Giles. "You and Your Job: A Guide for Instructors." Ferguson Publishing Company. Chicago, Illinois.
20. "Occupational Education in Agriculture High School." North Carolina Department of Public Instruction. Raleigh, North Carolina. 1969.
21. Rath. "Applying For A Job." Interstate.
22. Sinick. "Your Personality and Your Job." Science Research Associates. Chicago, Illinois.

23. Stone. "How To Choose Your Work." Bruce Publishing Company. 1969.
24. ——— "How To Get A Job." Bruce Publishing Company.
25. Turner. "Changing a Job." Follett Educational Corp. Chicago, Illinois.
26. ——— "The Family You Belong To." Follett Educational Corp.
27. ——— "The Friends You Make." Follett Publishing Company. 1962.
28. ——— "Holding A Job." Follett Educational Corp.
29. ——— "The Jobs You Get." Follett Publishing Company.
30. ——— "The Language You Speak." Follett Publishing Company. 1965.
31. ——— "The Letters You Write." Follett Publishing Company. 1966.
32. ——— "Looking For a Job." Follett Publishing Company. 1967.
33. ——— "The Money You Spend." Follett Publishing Company. 1962.
34. ——— "The Movies You See." Follett Publishing Company. 1966.
35. ——— "The Newspapers You Read." Follett Publishing Company. 1965.
36. ——— "The Phone Calls You Make." Follett Publishing Company. 1966.
37. ——— "Starting A Job." Follett Publishing Company. 1967.
38. ——— "The Television You Watch." Follett Publishing Company. 1965.
39. ——— "The Town You Live In." Follett Publishing Company. 1962.
40. ——— "Training for a Job." Follett Publishing Company. 1967.
41. ——— "Wanting a Job." Follett Education Corporation. 1967.
42. "Unipacs on Consumer Education." Madison Public Schools, Madison, Wisconsin.
43. "You and Your Job: How to Get It." Milwaukee Vocational Technical and Adult Schools. 1967.

C. Transparencies
1. "Succeeding At Work." United Transparencies, Binghamton, New York.
2. "I Want A Job." United Transparencies.

D. Films
1. "Preparing For the World of Work." BW Film, Guidance Associates, Pleasantville, New York.
2. "Where The Action Is." Instructional Media Center, Visual Instruction Bureau, Division of Extension, Drawer W, The University of Texas, Austin, Texas.

E. *Filmstrips*
1. The following are available from: Guidance Associates, Pleasantville, New York 10570
"A Job That Goes Someplace"
"An Overview of Technical Education"
"Choosing a College"
"Choosing Your Career"
"Dropping Out - The Road to Nowhere"
"Exploring Moral Values"
"Four Who Quit"
"Getting & Keeping Your First Job"
"Jobs For High School Students"
"Liking Your Job and Your Life"
"Preparing for the Jobs of the 70's"
"Preparing for the World of Work"
"Reflections of Myself: The Adolescent Experience"
"Somebody's Cheating"
"Teen Age Rebellion: Challenge to Authority"
"The Alienated Generation"
"The Role of the Counselor in the Secondary School"
"The Tuned Out Generation"
"Think of Others First"
"Trouble At Work"
"Understanding Your Parents"
"Values for Teenagers — The Choice is Yours"
"Why Work at All"
"You and the Law"
"Your First Week on the Job"
"Your Job Interview"
2. The following are available from: Popular Science Publishing Co. Audio-Visual Division, 355 Lexington Avenue, New York, New York 10017
"Job Finding II"
Civil Service Jobs
Skills That Pay Off
What Vocational Studies Can Do For You
"Personality Development"
Facing Disappointments
Making Decisions
Taking Criticism
Taking on Responsibility
To Be Somebody
Turning Over A New Leaf
"Career Opportunities I"
Career Planning in a Changing World

How to Study Occupations
Interests Pay Off
New Career Opportunities
Your Life at Work
"Career Opportunities II"
Automation
Careers in Science
Jobs in Mathematics
Salaried Worker or Self-employed
"Personal Problems"
Anxiety
Everyone Makes Mistakes
Frustrations
Personal Problem Solving
The Fight Against Fear
Status Seeking
"Knowing Yourself"
Needs, Satisfactions, Goals
On Being Different
So You Are Not Like Everybody Else?
Understanding Myself
Who Do You Want to Be?
Your Search for Self
"Getting Along in School II"
The Ins and Outs
The Psychology of Learning
Your Occupations - Student
"Family Living I"
Getting Along With Your Brothers and Sisters
Getting Along With Your Family
Is there a Typical Family?
Parents are People Too

F. Videotapes
The following are available from: Wisconsin Department of Public Instruction 126 Langdon Street, Madison, Wisconsin 53702

Lessons
10 Exploring Paper Industry Occupations
12 Exploring Machine Trade Occupations
13 Exploring Office Occupations
14 Exploring Marine Construction Occupations
15 Exploring Health Occupations
16 Exploring Public Utility Occupations
17 Exploring Telephone Company Occupations
18 Exploring Transportation Occupations
19 Exploring Radio & Television
20 Exploring Building Trades Occupations
21 Exploring Petroleum Industry Occupations
22 Exploring Conservation and Recreation Occupations
23 Exploring Leather Goods Occupations
24 Exploring Agricultural Occupations

HYDRAULICS

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in agricultural hydraulics and will be able to relate these factors to his/her own specific needs and aspirations.

B. Contrast various job opportunities in agricultural hydraulics regarding fringe benefits, retirement, vacation, promotion possibilities, and working conditions.

C. Explain the principles involved in hydrodynamics and hydrostatics.

D. Demonstrate and explain the relationship between pressure, velocity, flow and power in a hydraulic system.

E. Identify the basic components and indicate the primary function of a simple hydraulic circuit.

F. Calculate the recommended reservoir capacity of a system.

G. Demonstrate the principle of a heat exchange as used in mobile hydraulic equipment.

H. Identify and discuss the characteristics and usage of hydraulic hose, tubing and piping.

I. Explain the main differences between positive and non-positive displacement.

J. Identify each of the three types of fixed displacement pumps, and explain the characteristics of each.

K. Sketch and explain the operational principles of a variable displacement unbalanced vane pump, a variable displacement piston type pump, and an internal and external gear type pump.

L. Identify and discuss the purpose of pressure, directional, and control valves.
M. Trace the flow path of fluid through a direct acting relief valve, a pilot operated relief valve, a pressure sequence valve, and an unloading valve.
N. Trace the oil path in a hydraulic circuit operating a double acting cylinder and controlled by a two position, four connection valve.
O. Identify and properly name the 6 most commonly used values on agricultural equipment.
P. Identify and discuss the function of each part of piston and vane type cylinders, the advantages and disadvantages of hydraulic motors, the types and uses of accumulators in mobile hydraulic systems.
Q. Explain the functions and properties of hydraulic fluids.
R. Discuss and identify fluid contaminants and the methods of removal.
S. Describe and apply procedures of maintenance as it relates to the use of fluid lines, couplings and seals.

II. Concepts to Develop

A. There are career opportunities in the field of hydraulics for young men and women at all levels of education preparation.
B. The development and trends in the use of hydraulics in the agricultural industry has greatly increased in recent years.
C. To properly understand the principles and uses of hydraulics one must become familiar with the science of liquids under pressure and energy transfer (Pascal's Law).
D. Each basic component in the hydraulic system has a specific function.
E. There is a positive relationship between pressure and flow in a hydraulic system.
F. Mobile hydraulic equipment requires several types of basic components.
G. Hydraulic fluids have specific properties.
H. Contaminants increase wear and reduce the efficiency of the hydraulic system.
I. Regular maintenance procedures relating to fluid lines, couplings and seals is essential if trouble free operation is to be realized.
J. Correct trouble shooting procedure results in early detection of the problem and its solution.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Hydraulic principles
1. Relationship of pressure and flow
2. Transfer of energy.
3. Methods of measuring pressure and vacuum.
4. Determining the force, power and horsepower.
5. Parallel and series circuits.

C. Components of a hydraulic circuit
1. Function of each basic component: pump, actuator, valve, reservoir, hoses and tubing.
2. Location of each component in a circuit.

D. Principles of pump operation
1. Types of pumps in common use.
2. Pump classification.
3. Pressure, flow and displacement rating.
4. Determine volumetric efficiency of pumps.
5. Advantages and disadvantages of commonly used pumps.

E. Principles of valve operation
1. Pressure, directional and flow control valves.
2. Operating principle of each of the commonly used valves.

F. Actuator operation
1. Major types of cylinders.
2. Advantages and disadvantages of hydraulic motors.
3. Function of accumulators.

G. Fluids, filters and strainers.
1. Hydraulic fluid recommendations.
2. Filter and strainer requirements.

H. Fluid lines, couplings and seals
1. Sizing tubing and couplings to a hydraulic system.
2. Hose vs. tubing or pipe.
3. Maintenance recommendations.

I. Trouble shooting
1. Procedure for checking efficiency of all major components in a hydraulic circuit.

IV. Motivation

A. Field trips to implement dealers, industry, farm or logging operations where hydraulic equipment is being used or repaired.
B. Films, filmstrips and slides.
C. Class presentation by an implement dealer or mechanic.
D. Bulletin board displays.

V. Learning Activities

A. Occupational experience programs.
B. With use of hydraulic workbooks, work out a series of experiments on hydraulic test benches.
C. Collect samples of all basic components for individual and group study.
D. Construct a simulated heat exchanger and demonstrate its operation.
E. Disassemble a cylinder and check override and cushioning devices.
F. Check operation of hydraulic equipment on home farm. Report to class.
G. Determine cost of replacing a pump on a farm tractor.
H. Sketch a simple circuit and trace fluid flow in all control valve positions.
I. Set up a hydraulic circuit on the test benches and determine the pressure, flow and horsepower developed.
J. With use of a hydraulic tester, determine the efficiency of a tractor's hydraulic system.

VI. Materials Needed

A. Books
1. American Oil Company, *Hydraulic Power Transmission.* American Oil Company, 910 S. Michigan Ave., Chicago, Illinois. 60680.
2. Basal. *Mobile Hydraulics Manual.* Sperry Rand Corporation, Troy, Michigan 48048. 1968.
3. Bureau of Naval Personnel. *Fluid Power.* U. S. Navy Training Publications Center, Memphis, Tennesee 1966.
4. Deere Co. *Fundamentals of Service Hydraulics.* John Deere Co. Moline Illinois 1967.

B. Bulletins and Pamphlets
1. "A Course Outline for An Introduction to Fluid Power." National Fluid Power Association, Thiensville, Wisconsin.
2. "Hydraulic Power Transfer Systems." Ohio State University, 980 Kinnear Road, Columbus, Ohio 43212, 1965.
3. "I And T Shop Service." Technical Publications Inc. 1014 Wyandotte Street, Kansas City, Missouri, 64105, 1966.
4. "Tractor Hydraulics." American Association for Agricultural Engineering and Vocational Agriculture, Athens, Georgia.
5. "Vocational Education and Occupation Handbook." Superintendent of Documents Catalog No. FS 5.280:-80061. U. S. Government Printing Office, Washington, D. C.

C. Films
1. "Application of Pascal's Law Part I." United World Films, Government Films Department, 1445 Park Ave., New York, NY.
2. "Application of Pascal's Law Part II." United World Films.
3. "Basic Principles of Hydraulics." Jam Handy Organization, 2821 S. Grand Blvd., Detroit 12, Michigan.
4. "Controlled Power." Sperry Rand Corporation. Troy, Michigan.

Filmstrips
1. "Hydraulic Cylinders." Visual Education, Inc. Southern Building, 1425 H. Street, N.W. Washington, D.C. 20005
2. "Hydraulic Pumps." Visual Education Inc.
3. "Hydraulic Valves." Visual Education, Inc.

Slides
1. "Applied Hydraulics." Visual Education Inc.
2. "Basic Hydraulics." Visual Education Inc.
3. "FOS-10 Hydraulics" John Deere Company
4. "Hydraulic System for Grain Harvesting." Visual Education Inc.

D. Laboratory Manuals
1. Daines. *Basic Hydraulics Workbook,* Technical Systems, Inc. 1970 (To be used with Technical Systems Hydraulic Test Benches.)

E. Periodicals
1. *Hydraulics and Pneumatics.* 614 Superior Ave. West Cleveland, Ohio.
2. *Implement and Tractor.* Intertec Publishing Corp. 1014 Wyandotte Street, Kansas City, Missouri, 64105

F. Equipment
1. Hydraulic Test Bench. Technical Systems Inc. 715 Raymond, St. Paul, Minnesota, 55114.

LANDSCAPING AND TURF MANAGEMENT

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in landscaping and turf management and will be able to relate these factors to his/her own specific needs and aspirations.

B. Identify the blade, sheath, collar, and ligule of grass.

C. Recommend a grass which is suited or adapted to:
1. Shady area
2. Steep slopes
3. Golf green
4. Fairway
5. Poor sandy soil
6. Athletic field

D. Identify and list its major characteristics and uses:
1. Kentucky bluegrass
2. Fescues
3. Ryegrasses
4. Bent grasses

E. Calculate the amount of seed to use in order to follow recommended seeding rates for the following seeding programs:
1. Fescue
2. A recommended seed mixture with three or more grasses in it.
3. Kentucky bluegrass.

F. Find and record the following information from a grass seed sack or package:
1. Kind of grass in the package
2. Percentage of germination
3. Date of testing
4. Percentage of weed seeds and other crop inert matter.

G. Calculate the amount of actual nitrogen, P and K in each sample of fertilizer.

H. Recommend application rates for five fertilizers to supply one pound of nitrogen per 1,000 square feet.

I. Demonstrate in the field or report in the classroom the following three methods of determining when an adequate amount of water has been applied to a turf area:
1. Using rain guage
2. Timing
3. Measuring depth of soakage in soil.

J. Analyze three poorly managed turf areas, prepare a list of possible causes, and recommend in writing a program of renovation and management to improve the turf.

K. Identify the following weeds and name the recommended chemical control:
1. Crabgrass
2. Goosegrass
3. Spreading witchgrass
4. Green foxtail
5. Yellow foxtail
6. Barnyard grass
7. Chickweed
8. Dandelion
9. Buckhorn plantain
10. Broadleafed plantain
11. Thistles
12. Dock
13. Cinquefoil
14. Knotweed
15. Spotted spurge
16. Red sorrel
17. Quackgrass
18. Creeping Charley.

L. Identify and recommend approved control procedures for the following insects:
1. Grubs
2. Chinchbugs
3. Leaf hoppers
4. Sod webworms
5. Army worms
6. Cutworms.

M. Identify the disease causing the damage to a group of diseased plants and recommend maintenance and cultural practices to prevent or minimize disease damage in the future.

N. Identify the disease damages and recommend an approved control procedure:
1. Rust
2. Powdery mildew
3. Fading out disease
4. Brownpatch
5. Cottony blight
6. Dollar spot.

O. Demonstrate in the field the proper calibration and/or operation procedures of the following equipment:
1. Fertilizer spreaders
2. Mowers (rotary, reel, greens)
3. Sod-cutting machines
4. Aerifying machines
5. Rototillers
6. Power rakes
7. Rollers
8. Tractors
9. Sprayers.

P. Perform the following operations on three lawn mowers:
1. Adjust cutting height to 1", 2", and 3".

2. Sharpen and balance the blades.
3. Prepare mower for winter storage.
4. Lubricate.
5. Change oil.
6. Remove and clean spark plug.
7. Adjust engine speed.

Q. Identify the symbols and procedures used in a landscape plan.

R. Visit the site of a new house construction and:
1. Make a site survey.
2. Complete a family needs analysis.
3. Develop a suitable landscape plan, adaptable to the area, using basic concepts covered during instruction.
4. Develop a planting list of adapted plant materials for site.
5. Work out a total cost estimate for project.

S. Identify in writing the following plant materials:
1. Evergreens
   a. Arbor Vitae
   b. Mugho Pine
   c. Junipers
   d. Yews
   e. Spruce
   f. Pine species.
2. Trees
   a. Maples
   b. Elms
   c. Oaks
   d. Linden
   e. Locust
   f. Ash
   g. Poplar.
3. Specimen of Ornamental Trees
   a. Birch
   b. Flowering Crabs
   c. Mountain Ash
   d. Blue Spruce.
4. Flowering Shrubs
   a. Spirea
   b. Hydrangea
   c. Lilac
   d. Potentilla
   e. Dogwoods
   f. Euonymus
   g. Viburnums
   h. Mock Orange.
5. Hedging
   a. Privet
   b. Honeysuckle
   c. Alphine Currant
   d. Cotoneaster.
6. Perennial Flowers
   a. Iris
   b. Mums
   c. Lupine
   d. Delphinium
   e. Phlox
   f. Poppies
   g. Peonies
   h. Asters.
7. Bulb Plants
   a. Tulip
   b. Daffodil
   c. Crocus
   d. Hyacinth
   e. Lillies.
8. Tender
   a. Dahlia
   b. Begonia
   c. Caladium
   d. Gladiolus.

T. Properly prune an area of hedging, a tree, or shrub, according to principles studied in class.

II. Concepts to Develop

A. There are career opportunities in landscaping and turf management for young men and women at all levels of educational preparation.

B. Good lawns and turf areas are the result of proper establishment and maintenance practices.

C. Landscape planning and design is important to the establishment of good home areas.

D. Plants vary in structure and this is considered in determining their best use.

E. Structures such as sidewalks and fences are used in landscape plans.

F. Each landscape plot needs a care program to insure it reaches its full landscape potential.

G. Ornamental pests and diseases may be controlled by a management plan.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Importance of landscape and turf businesses.

C. Characteristics of a good turf
1. Thickness.
2. Color.
3. Texture.
4. Freedom from weeds, insect damage, disease.

D. Establishment of a new lawn
1. Soil requirements, testing, improvements.
2. Establishing grade.
3. Drainage and erosion problem.

E. Soil preparation
1. Tillage.
2. Fertilization, liming, amendments.
3. Planting.
   a. Varieties and species (selection and characteristics).
   b. Seeding (methods, rates, depth).
   c. Sodding (procedures used).
   d. Watering.
   e. Mulching.

F. Maintaining the lawn
   1. Mowing
      a. Height of mower.
      b. Removal of clippings.
      c. Frequency of cutting.
      d. Types of mowers, maintenance.
   2. Watering
      a. Amount to apply.
      b. Frequency of application.
      c. Equipment and calibration.
   3. Fertilization
      a. Types and formulation of fertilizers.
      b. Benefits of fertilization.
      c. When to apply.
      d. Rates and methods of application.
   4. Weed control in lawns
      a. Identification of common turf weeds.
      b. Weed control.
         (1) Fertilization, mowing, watering.
         (2) Mechanical.
         (3) Herbicides.

G. Renovation or repair of poor lawns
   1. Causes of poor turf.
   2. Steps in renovation.

H. Operation, adjustment, and repair of turf equipment
   1. Mowers.
   2. Fertilizer spreader and seeders.
   3. Thatchers.
   4. Areators.
   5. Sod cutters.
   6. Spray equipment.
   7. Irrigation equipment.

Landscaping

A. Landscape planning and design
   1. Reasons for or benefits from landscaping.
   2. Reading and interpretation of landscape drawings.
   3. Making and using a site survey.
   4. Family needs analysis.
   5. Survey of site.
   6. Structural drawing of site.
   7. Layout of landscape plan.
   8. Special problems, areas, and materials.

B. Landscape structures
   1. Sidewalk, driveways.
   2. Fences.

C. Selection and use of plant materials
   1. Compile a list of adapted plant material.
   2. Uses of plants in the design.

D. Care and maintenance of landscape plants
   1. Pruning.
   2. Fertilization.
   3. Mulching.
   4. Watering.
   5. Weed control.
   6. Insect and disease control.

E. Control of ornamental plant pests and diseases
   1. Losses caused by pests and disease.
   2. Symptoms and identification of problem.
   3. Classification.
   4. Control activities.

IV. Motivation

A. Field trips to lawns, golf courses, recreational areas, parks, new home construction, good and poor home lawns, commercial sod production area and nursery area.
B. Interviews and class presentations in the subject matter area.
C. "Hands on" learning activities of skills involved.
D. Bulletin board displays.
E. Movies, slide series.

V. Learning Activities

A. Occupational experience program.
B. Sharpen, adjust, calibrate, or repair various equipment used in landscape and turf work.
C. Take a soil sample, test, and analyze recommendations for a turf area.
D. On a plot of turf, experiment with various fertilizer applicators, weed control methods, mower height, etc.
E. Seed and sod plots of lawn area following the steps talked about in class.
F. Make a site survey of a new house construction.
G. Make a family needs analysis for a landscape plan.
H. Develop a landscape plan for a building using procedures talked about in class.
I. Prune shrubs, trees, hedges.
J. Lay out a grade line on a new building construction lot.
K. Collect pictures and descriptions of plant materials adaptable for landscape plans in your area.

VI. Materials Needed

A. Books
   1. Crockett. *Landscape Gardening.* Time-Life Books. 1971
   2. Crockett, *Lawns and Ground Covers.* Time-Life Books. 1971
   3. Hoover. *Approved Practices in Beautifying the Home Grounds.* Interstate Publishers. 1959
   4. Nelson. *Landscaping Your Home.* University of Illinois.
   5. Wise. *The Lawn Book.* Bowen Press.

B. Bulletins and Pamphlets — University of Wisconsin-Extension.
   1. "A Guide to Home Landscaping," Special Circular No. 98
   2. "Controlling Lawn Weeds," Special Circular No. 118
   3. "Deciduous Shrubs — Pruning and Care," Circular No. 590
   4. "Evergreens — Their Care — Maintenance," Circular No. 576
   5. "Home Lawns," Circular No. 445
   6. "Identifying Grasses in Wisconsin Turf," Special Circular No. 69
   7. "Lawn Diseases in the Midwest," North Central Extension
   8. "Shade Trees — Pruning and Care," Circular No. 608

C. Films and Filmstrips
   1. "Basic Techniques for Home Landscaping," Film Bookings, Motion Picture Service, USDA, Washington D.C., 20205
   2. "Beautiful Lawns," National Plant Food Institute, 1700 K Street NW, Washington D.C., 20006
   3. "Care and Management of Lawns," Vo-Ag Service, University of Illinois.
   4. "Turf Care," Associated Films, Inc. 600 Grand Ave. Ridgefield, NJ 07667

D. Laboratory Manuals
   1. *"Landscape Design,"* Student Manual 3s, Pennsylvania State University, College of Agriculture, Dept. of Agr. Ed., University Park, Pennsylvania.
   2. *"Landscape Maintenance Establishment,"* Student Manual 2t, Pennsylvania State University, College of Agriculture, Dept. of Agr. Ed., University Park, Pennsylvania.
   3. *"Nursery Production,"* Student Manual 4s, Pennsylvania State University, College of Agriculture, Dept. of Agr. Ed., University Park, Pennsylvania.
   4. *"Turfgrass Maintenance and Establishment,"* Student Manual 4t, Pennsylvania State University, College of Agriculture, Dept. of Agr. Ed., University Park, Pennsylvania.

E. Periodicals
   1. *Flower and Garden*
   2. *Lawn Care*

LIVESTOCK MARKETING

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the livestock marketing industry and will be able to relate these factors to his/her own specific needs and aspirations.
B. Compare the different methods of marketing livestock.
C. Choose the best marketing system for the local area.
D. Describe the current marketing opportunities available to area producers.
E. Discuss the reasons for the seemingly wide price spread between what the producer gets for his livestock and what the consumer pays for choice cuts of meat.
F. Describe the meat distribution channels.
G. Contrast the various methods of selling and pricing.
H. Suggest procedures which will help prevent losses in shipping.
I. Describe a meat processing plant operation.
J. Explain the key forces that determine the price of meat.
K. Discuss the various points or levels in the marketing system.

II. Concepts to Develop

A. There are career opportunities for young men and women at all levels of educational preparation in livestock marketing.
B. Some feed additives may be detected in meat and therefore are banned.
C. Federal meat inspection is an aid in safeguarding public health.
D. Meat animals are not all steak and roasts.
E. Several innovations in livestock marketing have occurred in recent years.
F. Some marketing methods return more money to the farmer than others.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Area markets
   1. Names of local outlets.
   2. Distance.
   3. Location.
   4. Price.
   5. Feed and water at the market place.
   6. Insurance.
   7. Transportation.
   8. Other services offered.
   9. Number of buyers present — Competition in the market place.

C. Trends and development
   1. Computerized selling.
   2. Innovations in auction markets.
   3. Changes in public markets.

D. Role of the future's markets
   1. Cattle.
   2. Hogs.
   3. Feeder cattle.

IV. Motivation

A. Field trips to tele-a-market, auction market, local buying stations and central markets.
B. Field trip to packing plants.
C. Slides, filmstrips, and films.
D. Bulletin board displays.
E. Class presentations by marketing specialists.

V. Learning Activities

A. Occupational experience programs.
B. Plot market prices of live cattle and hogs for a period of one year — local and central market.
C. Plot future prices of cattle and hogs for a period of one year.
D. Plot livestock prices on a graph and compare the percent of the consumer's dollar the farmer receives for meat with other agricultural products of the community.
E. Prepare a bulletin board display depicting the functions carried on in a terminal public livestock market.
F. Prepare a demonstration on practices which may be used to reduce losses in shipping livestock to market.

VI. Materials Needed

A. Books
   1. *Cattle Futures Handbook* — Interstate.
   2. *Marketing of Livestock and Meat* — Fowler. Interstate. 1961.
   3. *Modern Marketing of Farm Products* — Interstate. 1968.

B. Bulletins and Pamphlets
   1. "Farm Business Management — Use of Future Markets" — A2325 University of Wisconsin-Extension.
   2. "Futures for Livestock — Value as Marketing and Management Tools" — R2175 University of Wisconsin-Extension.

C. Periodicals
   1. *Doane's Agricultural Report*
   2. *Drovers Journal*
   3. *Kiplinger Report*
   4. *State Marketing Report*
   5. *Wall Street Journal*

D. Films and Filmstrips
   1. "Profit Insurance", Farm Film Foundation, 1425 H. Street N.W., Washington, D.C.
   2. "Hog Grading", BAVI 4384.
   3. "Meat and Meatpacking", BAVI 3885.
   4. "Today's Guidelines for Pork", BAVI 7693.

LIVESTOCK SELECTION AND EVALUATION

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the livestock selection areas and relate these factors to his/her own specific needs and aspirations.
B. Identify and compare the characteristics of the various breeds.
C. Identify and list all parts of an animal in each specie.
D. Place classes of animals with type as the criteria for evaluation.
E. Use a systematic approach in giving oral /written reasons for a class placing.
F. Place a class of livestock utilizing production records as the criteria for evaluation.

II. Concepts to Develop

A. There are career opportunities in the livestock industry for young men and women at all levels of educational preparation.
B. A systematic evaluation procedure is essential in livestock selection.

C. A knowledge of breed characteristics is vital when selecting replacements for the breeding herd.

D. Production records are a useful tool in livestock evaluation and selection.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment information.
   2. Job descriptions.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relative to potential employment.

B. Why judge livestock?
   1. Success depends on the ability to select the best animals.
      a. Breeding stock.
      b. Market and slaughter animals.
   2. Acquiring judging skill.
      a. Formal instruction.
      b. Experience.
   3. Basic characteristics of the livestock judge
      a. Desire to know livestock.
      b. Mental image of the ideal type.
      c. Develop the power of observation.
      d. Develop the ability to make a logical analysis.
      e. Develop the independence of thought.
      f. Develop the ability to give effective reasons.
         1) Written.
         2) Oral.
      g. Develop familiarity with all body parts of the various breeds.
         1) Name and location of each body part.
         2) Function of each body part.
         3) Degree of importance of each body part.

C. Examination and placing of animal classes.
   1. Use an accepted system of evaluation.
   2. The value of first impressions.
   3. Viewing from a distance (20-30 feet).
      a. View from the side.
      b. View from the rear.
      c. View from the front.
   4. Close-up inspection — place hands on the animal when permitted to do so.
      a. Determine depth, fullness and smoothness.
   5. Observe animals on the move
      a. Lameness.
      b. Other leg and foot defects.
   6. Comparative judging.
      a. Evaluate and rate each animal in relationship to the ideal specimen.
   7. Natural division of classes.
      a. By pairs or groups.
      b. Easy top animal.
      c. Easy bottom animal.

D. Reasons for placing the class
   1. Begin by naming the class and state the order in which the animals were placed.
   2. State the reasons why an animal is placed at the top of the class. Admit any weaknesses that he or she may have.
   3. State reasons why the top animal is placed over the second, the second over the third and the third over the fourth. A few remarks concerning the last place animal is usually appropriate. Always point out weaknesses which exist when placing one animal above the other.
   4. Conclude your remarks by again naming the class and giving your final placing.

IV. Motivation

A. Field trips to buying stations and processing plant.
B. Livestock buyer or judge speaks to class.
C. Slides, films, filmstrips.
D. Bulletin board displays.

V. Learning Activities

A. Field trips to local farms to judge various classes of livestock.
B. Enter livestock judging contests.
C. Participate in local fairs and shows.
D. Judge livestock classes by utilizing pictorial classes obtained from breed associations.

VI. Materials Needed

A. Books:

   1. Acker, Duane, *Animal Science and Industry*, Prentice Hall, Inc., 1963.
   2. Anderson, A. L., and Kiser, J. J., *Introductory Animal Science*, The Mac Millin Co., 1963.
   3. Beadle, George and Muriel, *The Language of Life*, Doubleday and Co., 1966.
   4. Brewbaker, James L., *Agricultural Genetics*, Prentice Hall, Inc., 1964.
   5. Briggs, Hilton M., *Modern Breeds of Livestock*, The Mac Millin Co., 1958.
   6. Cole, H. H., *Introduction to Livestock Production*, W. H. Freeman and Co., 1962.
   7. ————————, *Introduction to Live-*

stock Production, W. H. Freeman and Co., 1966.
8. Ensminger, M. E., *The Stockman's Handbook*, 3rd edition, The Interstate, 1962.
9. Garrigus, W. P., *Introductory Animal Science*, 3rd edition, J. B. Lippincott Co., 1960.
10. Hutt, Frederick B., *Animal Genetics*, The Ronald Press Co., 1964.
11. Snapp, R. P., and Neuman, A. L., *Beef Cattle*, 5th edition, John Wiley & Sons. 5th printing, 1966.
12. Youtz, H. G., and Carlson, A. C., *Judging Livestock, Dairy Cattle, Poultry and Crops*, Prentice Hall., 1962.
13. Zeuner, Frederick, *A History of Domesticated Animals*, Harper and Row, 1963.

B. Booklet:
1. "Recommended Guides for Carcass Evaluation & Contests," American Meat Science Association, 36 S. Wabash Ave., Chicago, Illinois.

C. Bulletins:
1. Future Farmers of America National Contests, Future Farmers of America Foundation, Inc. Bulletin No. 4, Nov. 1964, Office of Education, Department of Health, Education and Welfare, Washington, D. C. 20202.
2. National Livestock and Meat Board, Literature and Educational Services, 36 South Wabash Ave., Chicago, Ill. 60603. Booklet "101 Meat Cuts," wall sized charts of beef, pork, and lamb. Set of full color slides on retail cuts of meat. "Meat Judging Handbook" 72 pages.
3. United States Department of Agriculture Bulletins Livestock Division, Ag. Marketing Service, Washington, D. C. 20250.
Farmers' Bulletin 1263, Breeds of Swine
Farmers' Bulletin 2196 Finishing Beef Cattle
Farmers' Bulletin 2126, The Farm Beef Herd
Service and Regulatory Announcement No. 112, Official U.S. Grades for Slaughter Cattle, and posters illustrating these grades.
Service and Regulatory Announcement No. 99, Official U.S. Standards for Grades of Carcass Beef.
Service and Regulatory Announcement No. 123, Official U.S. Standards for Lamb, Yearling Mutton, and Mutton Carcasses.
4. University of Wisconsin
Ag. Extension Service Special Circular No. 63, Jan. 1961 Livestock Selection Guide
Circular No. 497, How to Feed, Fit, and Show Lambs
Special Circular No. 36, Buying and Selling Feeder Pigs

D. Periodicals:
1 *Agricultural Education Magazine*, Oct., 1967, Vol. 40, page 80, "A New Concept in Visual Aids," John Blessent.

E. Slides:
1. Iowa State College, Ames, Iowa
Department of Animal Science
Set of approximately 25 slides showing the entire carcass (beef) cut crosswise into sections showing animals of varying degrees of finish.
2. Nasco, Ft. Atkinson, Wisconsin
Slides from Texas A & M showing classes of swine with cutout information. Approximately 60 slides. Other overlays depicting outlines and skeletal structure.

MARKETING DAIRY PRODUCTS

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the marketing of dairy products and will be able to relate these factors to his/her own specific needs and aspirations.
B. List and discuss factors that contribute to the importance of milk and dairy products.
C. List and discuss factors that affect the geographical location of the dairy cow.
D. Locate the leading states in milk and dairy products production.

E. Identify and list the stages in which milk moves from the farm to the consumer.
F. List and discuss market outlets that a farmer may choose for his milk.
G. Indicate and discuss significant highlights of the history of milk pricing.
H. Analyze and discuss the factors that influence prices of fluid milk.
I. Be familiar with the types of organizations that have developed in the cooperative marketing of milk and benefits the farmer gains from them.
J. Be familiar with and able to discuss the milk marketing orders.
K. List significant laws and regulations associated with milk and dairy products.
L. List and discuss the various standards and grades of milk and dairy products.
M. Discuss and/or explain the specific areas of the price support program.
N. List ways of gauging the profitability of dairy firms.
O. Describe the uses of milk and a few pertinent points relative to each of the manufactured products.
P. Discuss the significant effect that imports and exports have on milk and dairy products.
Q. Be familiar with current ways of expanding dairy product exports and the role that each segment of the dairy industry may play.
R. Explain how dairy production affects the outlook of marketing dairy products.
S. List and discuss reason for changes in the utilization of dairy products.
T. List the significant affect that governments and foreign trade have on the outlook for dairy products.

II. Concepts to Develop
A. There are career opportunities in the dairy industry for young men and women at all levels of educational preparation.
B. Milk and dairy products contribute significantly to the agriculture industry.
C. The dairy industry has specific centers of production due to such factors as geography, climate, and economics.
D. Market channels exist for milk and dairy products.
E. Milk has a specific pricing structure and is governed by specific regulations.
F. Profitability in dairy products is determined by two methods.
G. Milk has a variety of uses.
H. Imports and exports influence dairy product marketing.
I. The future of dairy product marketing is determined by a variety of factors.

III. Subject Matter to Teach
A. Careers
1. Current and future employment needs.
2. Job descriptions.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.
B. Market importance of milk and dairy products
1. The farm value of dairy products.
2. The per capita consumption of dairy products.
C. Centers of production of dairy products
1. Factors that affect the location of the dairy cow.
2. Leading states in milk production.
3. Leading states in butter, cheese and and other dairy products.
D. Market channels for milk and dairy products
1. Three stages in which milk moves from the farm to the consumer.
2. Choice of market outlet.
3. Assembling dairy products from farms.
E. Milk pricing and regulations
1. The history of milk pricing.
2. Factors influencing prices of fluid milk.
3. Federal milk marketing orders.
4. State milk control.
5. Cooperative marketing of dairy products.
6. Sanitary regulations of milk and dairy products.
7. Standards and grades of milk and dairy products.
8. State trade practice laws in the sale of fluid milk.
9. The price support program.
F. Profitability of dairy processing firms
1. The two ways of gauging the profitability of dairy firms.
G. Selling milk for manufacturing purposes.
1. Number and size of milk manufacturing plants.
2. Condenseries and powder plants.
3. Ice cream and similar frozen desserts.
4. Cream, butter and nonfat dry milk.
5. Cheese factories.
6. Condensed and evaporated milk.
H. Imports and exports
1. Import quotas on dairy products.
2. Dairy products export potentials.
3. Ways of expanding dairy product exports.

I. Outlook for Dairy Products
   1. Affect of dairy production on the outlook.
   2. Factors that contribute to the changes in utilization of dairy products.
   3. The role of government programs in the outlook for dairy products.
   4. Foreign trade role in the outlook for dairy products.

IV. **Motivation**
   A. Field trip to milk processing plants.
   B. Visit a milk marketing organization.
   C. Class presentation by milk marketing representatives.
   D. Bulletin board displays.
   E. Show slides and films on marketing of dairy products.

V. **Learning Activities**
   A. Occupational experience program.
   B. Design a flow diagram of the market channels for milk and dairy products.
   C. Panel report on what methods of pricing are used in the market.
   D. Panel report on employment opportunities in the marketing of dairy products.
   E. Make up a display of the different dairy products.
   F. Analyze factors influencing the price of fluid milk.

VI. **Materials Needed**
   A. Books
      1. Diggins & Bundy. *Dairy Production.* Prentice-Hall Inc. 1969
      2. Ensminger. *Dairy Cattle Science.* Interstate. 1971.
      3. Judkins & Keener. *Milk Production and Processing.* John Wiley & Sons. 1966
      4. Mortenson. *Modern Marketing of Farm Products.* Interstate. 1963.
      5. Mortenson & Jurgenson. *Approved Practices in Dairying.* Interstate. 1964.
      6. Norton & Scranton. *Marketing of Farm Products.* Interstate. 1949.
      7. Peterson. *Dairy Science.* J. B. Lippincott Co. 1950.
      8. Reaves & Henderson. *Dairy Cattle Feeding and Management.* John Wiley & Sons. 1963.
   B. Bulletins and Pamphlets
      1. "After One Grade of Milk What?" Graf. Univ. of Wisconsin-Extension.
      2. "Alternative Uses for Milkfat Butterine," No. 39. Graf. Univ. of Wisconsin-Extension.
      3. "Can the Pricing of Milk be Made on the Basis of Its Protein Content?" No. 32. Graf. Univ. of Wisconsin-Extension.
      4. "Changing Patterns in Dairy Marketing, Grocery Chain Processing and Distribution of Dairy Products" No. 45. Graf. Univ. of Wisconsin-Extension.
      5. "Dairy Marketing Information, January 1971" Univ. of Wisconsin-Extension.
      6. "Implications of Dairy Outlook Situation to Dairy Promotion." Issue No. 57. Graf. Univ. of Wisconsin-Extension.
      7. "Information on Dairy Outlook, Marketing and Trends." Graf. Univ. of Wisconsin-Extension.
      8. "Market Adjustments Confronting Wisconsin Fluid Milk Processors." No. R 2422. Univ. of Wisconsin-Extension.
      9. "Market Structure and Competition in the Dairy Industry." No. P. 233. Univ. of Wisconsin-Extension.
      10. "Milk Programs of Food Chains." No. 47 Graf. Univ. of Wisconsin-Extension.
      11. "Outlook for Dairy" No. 49. Graf. Univ. of Wisconsin-Extension.
      12. "Relevant Issues Concerning Federal Milk Orders and Milk Pricing." Graf. Univ. of Wisconsin-Extension.
      13. "Resolving Grade B Conversion and Low Class 1 Utilization Pricing and Pooling Problems" No. R2503. June 1973. Univ. of Wisconsin-Extension.
      14. "The Dairyman Goes to Market" American Dairy Association of Wisconsin 4337 W. Beltline, Madison, Wisconsin.
      15. "Why Promote Dairy Products in Light of Current Supply, Demand, Government Policy and Foreign Trade Conditions?" No. 61. Graf. Univ. of Wisconsin-Extension.
   C. Films and Filmstrips.
      1. "Agribusiness is Everyone's Business" — BAVI 6804.
      2. "Evolution in Marketing Farm Products" — VEP. California State Polytechnic College, San Luis Obispo, California.
      3. "Fact Finders" — BAVI 6724.
      4. "Rewarding Careers in a Dynamic Industry" — BAVI 7409.
      5. "This is a Cooperative — BAVI 7014.
      6. "Wisconsin Agriculture" — BAVI 4129.
   D. Laboratory Manuals
      1. *Dairy Farm Worker.* Vocational Instructional Service. Texas A&M University, College Station, Texas. 77843.

MEAT PROCESSING

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the meat processing industry and will be able to relate these factors to his/her own specific needs and aspirations.
B. Distinguish breed characteristics of beef, pork, lamb, veal and poultry.
C. Be conscious of health and sanitation requirements in meat processing.
D. Describe the job functions of the state and federal meat inspectors.
E. List and differentiate between the parts of market animals and poultry.
F. List and describe all U.S.D.A. grades of market animals and poultry.
G. List and discuss the techniques of slaughter of market animals.
H. Distinguish and name the retail meat cuts of market animals and poultry.
I. Distinguish and name the wholesale meat cuts of market animals and poultry.

II. Concepts to Develop

A. There are career opportunities in the meat processing industry for young men and women at all levels of educational preparation.
B. Breed identification is important.
C. State and federal legislation governs the meat industry.
D. Meat inspection methods are necessary.
E. The nutritional content of various meats differ.
F. An employee needs to understand the development and trends in the meat processing industry.
G. U.S.D.A. grades of live and carcass animals are the standards of the industry.
H. Identification of wholesale and retail cuts are essential skills for meat processing.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job descriptions.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.
B. Breed characteristics
   1. Beef breeds.
   2. Pork breeds.
   3. Sheep breeds.
   4. Veal breeds.
   5. Poultry.
C. Health and sanitation in meat processing
   1. Health.
   2. Diseases and parasites of livestock and poultry.
D. Meat inspection
   1. Ante and post-mortem inspection.
   2. Labeling.
   3. Import and export inspection.
E. Part identification of market animals
   1. Parts of the beef and veal.
   2. Parts of the hog and lamb.
   3. Parts of poultry.
F. Grades of market animals
   1. Beef and veal grades.
   2. Pork and lamb grades.
   3. Poultry grades.
G. Slaughtering of market animals.
   1. Rendering insensible.
   2. Shackling and hoisting.
   3. Sticking and bleeding.
   4. Scalding and skinning.
   5. Removal of viscera.
   6. Splitting.
   7. Washing and shrouding.
   8. Cooling and storage.
   9. Wrapping.
H. Wholesale cuts
   1. Beef and veal wholesale cuts.
   2. Pork and lamb wholesale cuts.
   3. Poultry wholesale cuts.
I Retail cuts
   1. Beef and veal retail cuts.
   2. Pork and lamb retail cuts.
   3. Poultry retail cuts.
J. Occupations in the meat industry
   1. Production workers.
   2. Production supervisors.
   3. Mechanics.
   4. Quality control technician.
   5. Office workers and salesmen.
   6. Managers.

IV. Motivation

A. Field trip to meat processing plant.
B. Processing owner class presentation.
C. Bulletin board displays.
D. Slide series on meat processing.

V. Learning Activities

A. Occupational experience programs.
B. Design a flow diagram of a meat processing operation.

C. Collect various canned or dried products.
D. Determine freshness qualities of meat.
E. Reports on various areas of meat processing.

VI. Materials Needed

A. Books

1. Bundy & Diggins. *Livestock and Poultry Production.* Prentice Hall. Current Edition. 1960.
2. Ensminger. *Beef Cattle Science.* Interstate. 1960.
3. Ensminger. *Sheep Science.* Interstate. 1961.
4. Ensminger. *Swine Science.* Interstate. 1961.
5. Ziegler. *The Meat We Eat.* Interstate. 1966.

B. Bulletins and Pamphlets

1. Ahrens & Thompson. "Livestock Selection, A Resource Unit." Univ. of Wisconsin - Madison.
2. National Livestock and Meat Board. "101 Meat Cuts." 36 S. Wabash Ave. Chicago, Illinois.
3. U. S. Department of Agriculture. "How to Buy Poultry." U.S. Government Printing.
4. U. S. Department of Agriculture. "Slaughtering, Cutting, and Processing Pork."
5. Von Ruden. "Resource Unit on Meat." Dept. of Agriculture University of Wisconsin - Platteville.

C. Films and Filmstrips

1. "Meat Identification Kit." Interstate.
2. NASCO. Catalog 100. Fort Atkinson, Wisconsin.

METAL FABRICATION

I. Performance Objectives

A. Be familiar with current employment information such as job descriptions, job availablity, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the metal fabrication industry and will be able to relate these factors to his/her own specific needs and aspirations.
B. Identify the more common metals used in metal fabrication.
C. Select metals for a job according to basic physical and chemical properties, grade, and type.
D. Perform the five basic heat treatment processes necessary to obtain appropriate metal characteristics.
E. Read and translate welding, sheet metal and machinists, blueprints as to materials needed, and technical construction techniques and procedures.
F. Identify and operate general precision equipment used in the metal fabrication industries.
G. Set up, adjust, and operate AC, DC, MIG, TIG. spot, and oxy-acetylene welders.
H. Demonstrate proficient skill in welding the various types of weld joints in all positions on mild steel, high carbon steel, aluminum, stainless steel and cast iron.
I. Properly use and maintain all bench metal tools and equipment.
J. Set up correctly and safely operate all sheet metal equipment in the school shop. (Squaring shear, box and pan break, forming rolls, combination head, bar fold, soldering furnaces, nib and punch, and power nibbler.)
K. Lay out and construct sheet metal projects using a variety of sheet metal joints and fasteners.
L. Set up, adjust, and safely operate a metal turning lathe and a milling machine.
M. Calculate feeds and speeds on a metal turning lathe and on a milling machine.
N. Perform all basic operations on a lathe and mill within a specified tolerance determined by the instructor.
O. Set up, adjust, and safely use a drill press for precision drilling.
P. Estimate the repair or construction costs of a project.
Q. List and describe the phases of product development from original idea to market product.
R. Develop a matrix showing schematically the possibilities and alternative routes of professional improvement at the post secondary level.

II. Concepts to Develop

A. There are career opportunities in metal fabrication for young men and women at all levels of educational preparation.
B. Metal fabrication includes a cluster of skilled trades which are closely correlated.

C. Metal fabrication includes all the processes from the raw stock to the finished product.

D. An understanding of basic metallurgy is a necessary knowledge in many areas of metal fabrication.

E. The higher the competency level in the skilled areas the more likely one is to be successful on the job.

F. Many of the skilled areas of metal fabrication require an above average comprehension of basic mathematics and numerical relationships.

G. Cognitive and affective processes or behaviors are equally important to psychomotor behavior development in the preparation of individuals for employment in the metal fabrication trades.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Metallurgy
   1. Kinds of metal.
   2. Mechanical, physical and chemical properties of metal.
   3. Kinds and grades of steel.
   4. Methods of making iron and steel.
   5. Metal identification tests.
   6. SAE and AISI steel specifications.

C. Blueprint reading
   1. Welding, sheet metal and machinists blueprints.
      a. How to read and interpret.

D. Measurement
   1. Why measurement is so vitally important in metal working.
   2. Types of measurement tools and how to use them.
      a. Micrometers.
         1. Outside.
         2. Inside.
         3. Depth.
         4. Thread pitch.
         5. Direct reading.
      b. Calipers.
         1. Inside.
         2. Outside.
         3. Vernier.
      c. Steel rules.
      d. Test dial indicator.
      e. Telescope gauges.

E. Welding fabrication
   1. Types of welders.
      a. Alternating current (AC).
         1) Principles of operation and set up procedures.
         2) Uses.
      b. Direct current (DC).
         1) Principles of operation and set up procedures.
         2) Uses.
      c. Metal inert gas (MIG).
         1) Principles of operation and set up procedures.
         2) Uses.
      d. Tungsten inert gas (TIG).
         1) Principles of operation and set up procedures.
         2) Uses.
      e. Spot welders.
         1) Principles of operation and set up procedures.
         2) Uses.
      f. Oxy-acetylene welding.
         1) Principles of operation and set up procedures.
         2) Uses.
   2. Welding safety.
   3. Position welding — perform the following types of welds on both the AC and DC welders.
      a. Beads (flat).
      b. Pads (flat).
      c. Butt welds (flat).
      d. Fillet welds (flat).
      e. Vertical bead (up).
      f. Vertical butt (up).
      g. Vertical fillet (up).
      h. Vertical bead (down).
      i. Vertical butt (down).
      j. Vertical fillet (down).
      k. Overhead beads.
      l. Overhead butts.
      m. Pipe welds.
      n. Cutting.
      o. Piercing holes.
      p. Hard surfacing.
      q. Cast iron (beads.)
      r. Cast iron (butts).
      s. Carbon arc torch.
   4. Position welding operations on oxy-acetylene welding.
      a. Melt strips.
      b. Tent welds.
      c. Butt welds.
      d. Butt welds with filler.
      e. Fillet welds and filler.
      f. Horizontal butts with filler.
      g. Horizontal fillets with filler.
      h. Brazing (butts).

i. Brazing (fillets).
j. Cutting holes.
k. Cutting.

5. Spot welding operations.

F. Sheet metal fabrication
1. Soldering.
a. Principles of soldering.
b. Equipment and fluxes.
c. 1. Coppers.
2. Electric soldering guns.
3. Electric soldering irons.
4. Acid core solder.
5. Rosin core solder.
6. Bar solder.
7. Wire solder.
c. Sheet metal equipment.
1. Squaring shears.
2. Box and pan break.
3. Forming rolls.
4. Combination head.
5. Sheet metal stakes.
6. Hand nib and punch.
d. Sheet metal joints.
1. Construction.
2. Uses.
e. Procedures for securing sheet metal joints.
1. Self-locking.
2. Soldering.
3. Riveting.
4. Sheet metal screws.
5. Spot welding.
f. Sheet metal safety rules.

G. Machining.
1. Principles of the metal lathe.
2. Types of lathes.
3. Lathe parts and functions.
4. Calculating feeds and speeds.
5. Lathe safety rules.
6. Set up and operation for:
a. Mounting stock in 3 jaw chuck.
b. Drilling centers.
c. Mounting between centers.
d. Straight turning.
e. Turning to a square shoulder.
f. Tapering.
g. Knurling mild steel.
h. Threading.
i. Boring holes.
7. Precision calibration.
8. Care of the lathe.

H. Milling
1. Principles of milling.
2. Types of mills.
3. Mill parts and functions.
4. Calculating feeds and speeds.
5. Safety rules for milling.
6. Set up and operation for:
a. Milling flat surfaces.
b. Squaring stock.
c. Face milling.
d. Side milling.
e. Milling slots.
f. Drilling.
g. Boring.
h. Machining angular surfaces.
i. Milling slots and keyways.
j. Milling multi-level surfaces.
7. Care of the milling machine.

I. Production line work (last nine weeks of second semester, the class will design, fabricate, provide quality control, and market a product)

IV. Motivation

A. Employment records of previous graduates and listings of present employment opportunities.
B. Field trips to metal fabrication industries.
C. Tradesmen and employer discussions with the class.
D. Demonstrations.
E. Project and skill specimen displays.
F. Films, filmstrips and slides.

V. Learning Activities

A. Occupational experience programs.
B. An in-depth study of the metal working occupation cluster.
C. Construct metal projects.
D. Repair machinery and equipment.
E. Mass production project in which students execute every phase from original design to marketing.
F. Operate machines used in the metal fabrication industry.

VI. Materials Needed

A. Books
1. Bruce & Meyer. *Sheet Metal Shop Practice.* American Technical Society. Chicago, Illinois. 60637
2. Giachino & Weeks. *Welding Skills and Practices.* American Technical Society. 60637
3. Giachino, Weeks & Johnson. *Welding Technology.* American Technical Society. 60637
4. Johnson. *General Industrial Machine Shop.* Charles A. Bennett Co. Peoria Illinois.
5. Johnson. *Technical Metals.* Charles A. Bennett Co.
6. Johnson & Weeks. *Metallurgy.* American Technical Society.
7. Ludwig & McCarthy. *Metalwork Technology and Practice.* McKnight and McKnight Publishing Co. 60430

8. McCarthy & Smith. *Machine Tool Technology*. McKnight and McKnight Publishing Co.
9. Walker. *Modern Metalworking*. The Goodheart-Willcox Co.
10. *The Oxy-Acetylene Handbook*. Union Carbide Corporation. New York, NY
11. *The Starrett Book for Student Machinists*. L.S. Starrett Co. Athol, Massachusetts.

B. Films
1. "Adventures in Abrasives," Norton Company
2. "Arc Welding Electrode Selection," Hobart Bros. Co.
3. "Braze Welding," Red Arrow Sales
4. "Drama of Metal Forming," Shell Film Library
5. "Files — How to Choose and Use Them," Simonds Saw and Steel
6. "Futures in Welding," National Welding Supply Association
7. "Hard Facing," Red Arrow Sales
8. "How Metals Behave," American Society for Metals
9. "How to Select the Right Grinding Wheel," Norton Company.
10. "Magic Wand of Industry - Arc Welding," Lincoln Electric Company.
11. "Making Steel Behave," Association Films Inc.
12. "Metal Band Sawing - Tips and Techniques," Simonds Saw and Steel.
13. "Mig and Tig Welding of Aluminum," Reynolds Aluminum
14. "Modern Steel Making," U. S. Steel Corporation
15. "The Oxy-Acetylene Flame - Master of Metals," Bureau of Mines
16. "Prevention and Control of Distortion in Arc Welding," Association Films Inc.
17. "A Story of Arc Welding," Bureau of Mines
18. "Use and Care of Twist Drills," Cleveland Twist Drill Co.

OCCUPATIONAL EXPERIENCE PROGRAMS AND RECORDS

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Prepare a written commitment on a career interest.
B. Identify resources available for the development of a satisfactory occupational experience program.
C. Supply meaningful resource information to allow the instructor to cooperatively plan a satisfactory occupational experience program.
D. Tabulate the activities which will comprise the occupational experience program based on the resources available to him/her.
E. Satisfactorily complete a written agreement that pertains to the occupational experience program designed to meet the needs of the student, father (employer) and instructor.
F. Quantitatively identify the enterprise resources available.
G. Record data in the recommended conditions column for each enterprise or activity following instruction in that unit.
H. Write plans or goals that relate to the occupational experience program.
I. Prepare written results of the occupational experience program as it pertains to each enterprise activity.
J. Develop skills necessary to permanently record competencies gained as the result of instruction in agribusiness, natural resources, and environmental protection.
K. Prepare an inventory of items included in his occupational experience program.
L. Compile an accurate account of records of income and expenses for each enterprise of the occupational experience program.
M. Prepare a yearly financial summary of the occupational experience program.
N. Record compensation received for the work experience program.
O. Record accurate information on all phases of student involvement in FFA and other youth activities.

II. Concepts to Develop

A. There are career opportunities in the fields of agribusiness, natural resources, and environmental protection for young men and women at all levels of educational preparation.
B. There are a significant number of community resources available for the instructional programs of agribusiness, natural resources, and environmental protection.
C. The quality and quantity of the student's occupational experience program is directly related to the resources available.

D. The scope or quantity of a student's occupational experience program should be easily identified.
E. Understanding the content and importance of a written agreement is essential for business transactions.
F. Good records will indicate quantity and identify various enterprise resources.
G. Recording recommended conditions is important for future enterprise planning.
H. Written plans or goals are essential for enterprise development.
I. Written results are a means of determining enterprise improvement and development.
J. Competencies accurately recorded are useful in fulfilling a student's career choice.
K. An accurate inventory is an essential part of record keeping and is necessary to determine business profit or loss.
L. Accurately kept records of income and expenses are essential to enterprise accounting.
M. An annual summary of occupational experience program financial records allows for analysis of business enterprises; which include inventory gain or loss, total income, total expenses, net income or loss, interest on investment, labor income and cash from wages.
N. Records of work experience, financial compensation and hourly involvement is an integral part of a student's occupational experience program.
O. Accurate records of FFA and youth activities is a valuable aid in qualifying for FFA advancement, gaining employment, and personal records.

III. Subject Matter to Teach

A. Career opportunities available in agribusiness, natural resources, and environmental protection.
B. Resources available for development of occupational experience program.
   1. Dairy.
   2. Livestock.
   3. Poultry.
   4. Crops.
   5. Natural resources.
      a. Lakes.
      b. Streams.
      c. Wildlife habitat.
   6. Machinery.
   7. Tools and equipment.
   8. Employment opportunities.
C. Determine potential occupational experience program from resource check list.
D. Compilation of tentative occupational experience program.
   1. Enterprise or practice.
   2. Number or scope.
   3. Student's share.
E. How to write an occupational experience agreement
   1. Production agriculture.
      a. Enterprises included in the agreement.
      b. Plan for financing.
      c. Repayment plan.
      d. Division of income.
      e. Other points agreed upon.
      f. Importance of signatures.
   2. Work experience training agreement.
      a. Type of work.
      b. Number of hours and length of employment.
      c. Compensation in wages.
      d. Responsibilities of, place of employment, school and coordinator.
      e. Importance of signatures.
F. Identification of quantities of enterprise available
   1. Number.
   2. Breed.
   3. Ownership.
G. Recommended conditions as it relates to the enterprise or activity
   Example.
   1. Dairy.
      a. Kind and quality of roughage to feed.
      b. Sanitation and disease prevention.
   Example
   2. Forestry.
      a. Site Selection.
      b. Pruning.
H. Develop plans or goals as it relates to the student's involvement in that enterprise or activity.
   Example
   1. Beef
      a. Yearling steer feeding program.
      b. Housing.
   Example
   2. Fish and wildlife resources
      a. Wildlife habitat
      b. Pheasant rearing.

I. Evaluation techniques that relate to the student's involvement in that enterprise or activity.
   1. Results.
   2. Long range future plans.

J. Recording techniques that relate to competencies gained by students in agribusiness, natural resources, and environmental protection.
   Example
   1. Agricultural mechanics
      a. Butt weld
      b. Service air cleaner
   Example
   2. Outdoor recreation and environmental quality
      a. B.O.D. measure
      b. Monitor stream quality

K. Completion of an inventory
   1. Beginning inventory.
   2. Closing inventory.
   3. Numbers.
   4. Value.
   5. Interest on investment.

L. Identification of items included in account records
   1. Income and expenses.
      a. Cash.
      b. Exchange.
   2. Enterprise accounts.

M. Occupational experience program analysis
   1. Assets.
   2. Liabilities
   3. Net income or loss.
   4. Interest on investment.
   5. Labor income.
   6. Cash wages.

N. Recording pertinent information regarding work experience program to include
   1. Date.
   2. Type of work.
   3. Hours worked.
   4. Wages.

O. Summary of FFA activities
   1. Degrees earned.
   2. Honors won.
   3. Leadership participation.
   4. Public speaking.
   5. Judging teams and exhibiting.

IV. Motivation

A. Awards program in FFA
   1. Local.
   2. State.
   3. National.

B. Films
   Examples
   1. "Focus on Forty."
   2. "Profile of FFA."
   3. "Stars Over America."

C. Resource people that have FFA background
   1. Graduates.
   2. Farmers.
   3. Other local businessmen.

D. Slides of local accomplishments through former occupational experience programs.

E. Records and application of previous award winners based on occupational experience programs.

F. Field trips.

G. Bulletin board displays.

H. Attendance at State and National FFA Convention.

I. Visitations by State and National FFA Officers.

V. Learning Activities

A. Students work with simulated records to include:
   1. Duplicated sample copy pages.

B. Students fill out actual individual record book.

VI. Materials Needed

A. Books
   1. Binkley & Hammonds. *Experience Programs for Learning Vocations in Agriculture.* Interstate. 1970.
   2. Binkley & Hammonds. *Farming Programs for Students in Vocational Agriculture.* Interstate. 1961.
   3. Phipps. *Handbook on Agricultural Education in Public Schools.* Interstate. 1965.
   4. Phipps. *Your Opportunities in Vocational Agriculture.* Interstate. 1957.
   5. *Record and Plan Book for Student's Occupational Experience Program In: Agribusiness, Natural Resources, and Environmental Protection* - Wisconsin Association of Vocational Agriculture Instructors, 2702 Monroe Street. Madison, Wisconsin. 53711.

B. Slides
   1. Slides and tapes (FFA and Proficiency Award Areas) Future Farmers Supply Service, Alexandria, Virginia 22309.

C. Periodicals
   1. *Agricultural Education*
   2. *The National Future Farmer*

ORCHARD AND SMALL FRUIT PRODUCTION

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the small fruit production industry and will be able to relate these factors to his/her own specific needs and aspirations.

B. List the marketing methods and opportunities for fruit growing.

C. Select desirable planting sites for orchards and small fruits.

D. Plant trees for growth and orchard management.

E. Understand how plants grow, produce flowers and fruit.

F. Prune orchard trees to influence shape, growth and production.

G. Understand fruit grading and packaging.

H. Identify ten or more apple varieties by the fruit.

I. Understand the spray schedules and apply them with safety for the control of insects and diseases.

J. Understand the cultural practices needed for successfully raising apples, pears, cherries, plums, bush fruits and strawberries.

K. Understand the long range fertilization program to use.

L. List five or more strawberry varieties and categorize as early, mid-season, or late.

M. Successfully make three different types of grafts on woody plants.

II. Concepts to Develop

A. There are career opportunities in small fruit production for young men and women at all levels of educational preparation.

B. The orchard and small fruit areas are becoming highly specialized.

C. Marketing methods and procedures vary depending on the purpose of the business.

D. Up-to-date cultural and management practices are essential fo good orchards.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job description.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. History of the fruit industry

C. Establishing the plantings
1. Locating the site.
2. Planning the layout.
3. Selecting nursery stock.

D. Soil management and fertilization
1. Practices prior to planting.
2. Practices after planting.
3. Fertilization.
4. Plant deficiencies.

E. How plants grow
1. Affect of summer and winter temperature.
2. Affect of moisture and lights.
3. Flowers are basic to fruit production.
4. Photosynthesis.
5. Respiration.
6. Nitrogen affect on maturity.

F. Pollination and fruit set

G. Thinning, pruning and training
1. Shaping young trees.
2. Maintenance and productive pruning.

H. Grafting

I. Marketing quality fruit
1. Grading.
2. Packaging.
3. Established marketing name.
4. Storage.
5. Methods of marketing.

J. Controlling insect and disease pests
1. Insects and diseases.
2. Insecticides and fungicides.
3. Methods of application.

K. Exhibiting and judging fruit
1. Identification of fruit varieties.
2. Judging non-packed fruit.
3. Judging packed fruit.

L. Cultural practices
1. Apples, pears, peaches.
2. Cherries, plums.
3. Grapes.
4. Bush fruits - raspberries, blackberries, blueberries.
5. Strawberries.

IV. Motivation

A. Field trip to practice pruning orchard trees.
B. Field trip to apple processing plant.
C. Grafting demonstrations.
D. Bulletin board display.

V. Learning Activities

A. Occupational experience programs.
B. Collect samples of apple varieties.
C. Collect apple wood and make several kinds of grafts.

VI. Materials Needed

A. Books
1. Schneider and Scarborough. *Fruit Growing*. Prentice-Hall. 1960

B. *Bulletins and Pamphlets*
1. "Chemical Weed Control Suggestions for Fruit Crops," Wisconsin Circular 38. University of Wisconsin-Extension.
2. "Cherry Insects and Diseases in Wisconsin." Wisconsin Bulletin #5550
3. "Fruit Varieties for Wisconsin." Wis. Cir. 501 University of Wisconsin-Extension
4. "Grafting." Wis. Cir. 572 University of Wisconsin-Extension
5. "Growing Cherries East of the Rocky Mountains." USDA Farmers Bulletin #2185
6. "Growing Erect and Trailing Blackberries." USDA Farmers Bulletin #1995
7. "Growing Grapes in Wisconsin." Wis. Cir. 539. University of Wisconsin-Extension.
8. "Insect and Disease Control, Apples-Cherries, and Strawberries." Wis. Cir. 520. University of Wisconsin-Extension.
9. "Preparing Strawberries for Market." USDA Farmers Bulletin #1560
10. "Pruning Hardy Fruit Plants." USDA Farmers Bulletin #1870
11. "Pruning Standard Apple Trees." Wis. Cir. 643
12. "Strawberries for the Home Garden." Wis. Cir. 512
13. "Strawberry Pest Control." Wis. Cir. A1934 (SC103)
14. "Wisconsin Apple Insects." Wis. Bull. 548
15. "Wisconsin Raspberries." Wis. Cir. 515

C. Films
1. "Fruits of a Lifetime," Union Pacific
2. "Three Apples," BAVI
3. "Getting Started with Strawberries," BAVI 4428
4. "Raspberries for Extra Profit," BAVI 3628

OUTDOOR RECREATION AND TOURISM

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement, and other factors relative to potential employment in the recreation and tourist industry and will be able to relate these factors to his/her own specific needs and aspirations.
B. Trace the development of recreation and tourism in his/her state.
C. Discuss the importance of recreation and tourism to the economy of the local area and to the state.
D. Evaluate various areas of the county and the state as potential sites for recreation and tourism.
E. Design and develop a site for a specific recreational use considering the ecological impact of such development.
F. Develop and keep a simple set of records such as might be used by a recreational business venture.
G. Organize a work crew and supervise that crew in the satisfactory completion of a specific task.
H. Develop a list of machines and equipment needed for a specific recreational activity.
I. Operate efficiently such equipment as is applicable to a specific recreation area, ie., lawn mowers, sprinklers, power units, grooming devices, boats, motors, snowmobiles.
J. Be familiar with different individual and group recreational activities common at the type of area under study, including skiing, swimming, tennis and shuffle board.
K. Comprehend the basic principles of advertising, ie. newspaper, radio, personal letters, television and develop an effective publicity campaign.

L. Develop those personality traits which will allow him/her to make effective contact with the public and his/her co-workers.

M. Apply the necessary skills and abilities to develop a safety program suited to a specific recreation area program.

II. Concepts to Develop

A. There are career opportunities for young men and women in the tourism and outdoor recreation industry at all levels of educational preparation.

B. Recreation and tourism has been and is becoming an increasingly important economic asset to Wisconsin.

C. Recreation and tourism ranks third in economic importance to the state of Wisconsin.

D. Job openings are increasing in all phases of recreation and tourism in Wisconsin.

E. As population, per capita income and leisure time increases, there is a pressing need for larger and more recreational areas within the state.

F. The ecological impact must be considered when recreational areas are being planned and developed.

G. Proper employer-employee relationships are becoming increasingly important as recreational areas expand in size.

H. Equipment selection, maintenance, repair and proper operation is important in most recreational areas.

I. Most areas offer a variety of recreational activities, therefore, a working knowledge of several activities is necessary.

J. Advertising is an important part of the recreation industry and a knowledge of all publicity media is desirable.

K. Human relations becomes a more important factor as size of recreational areas increase.

L. Safety awareness is important to the satisfaction of the individual as well as to his liability exposure.

III. Subject Matter to Teach

A. Employment opportunities
1. Number of full-time job opportunities.
2. Seasonal opportunities.
3. Personal qualifications.
4. Opportunities for advancement.
5. Working conditions.
6. Salary considerations.
7. Fringe benefits.

B. Economic effects
1. Local.
2. County.
3. State.

C. Scope of the outdoor recreation and tourism industry
1. Present status.
2. Growth patterns.

D. Site selection
1. Location in respect to population centers.
2. Slope exposure.
3. Height and length of slope.
4. Soil type, drainage and surface conditions.
5. Accessability — types of roads.
6. Supportive facilities including lodging, restaurants, medical care and retail outlets.

E. Financing the operation
1. Sources of funds.
2. Daily rates.
   a. How determined.
   b. Influence of competition.
3. Financing opportunities.
4. Repayment plans and interest rates.

F. Facilities and equipment
1. Operating specialized equipment.
2. Maintenance of equipment.
3. Safety precautions.

G. Supporting facilities
1. Equipment selection.
2. The tack shop operation.
   a. Legal implications.
   b. Procedures to improve accuracy and speed of service.

H. Human relations skills
1. Personal mannerisms and grooming.
2. Methods of greeting, providing information and giving directions.
3. Personal traits of a good leader.
4. Advantages of the team approach.

I. Safety and public liability.
1. Types of injuries.
2. Causes of accidents.
3. Methods of preventing accidents.
4. Public Liability
   a. Insurance coverage.
   b. Operators's responsibility for customer safety.

IV. Motivation

A. Guest speakers involved directly in winter recreation and tourism.

B. Field trip to winter sports area to observe jobs performed by workers in the winter recreation and tourism industry.

C. Collect brochures from state recreational areas.

D. Visit local bank and discuss credit plans.

E. Films, filmstrips, and slides.

F. Bulletin board displays.

V. Learning Activities

A. Occupational experience programs.
B. Construct a bar graph to compare the income generated by Wisconsin tourism industries.
C. Prepare a map locating the winter recreation areas.
D. Prepare a list of jobs.
E. Prepare a list of personal qualifications and sources of training programs.
F. Take temperature readings on the north and south slope and compare the findings.
G. Use a clinometer to measure percent of slope.
H. Compute moisture content of snow.
I. Compute percent of slope.
J. Keep records of temperature, snow fall and other weather conditions and relate to attendance.
K. Locate on a map supportive services such as motels, restaurants, health facilities, theaters, supper clubs and grocery stores.
L. Develop a budget for a yearly operation.
M. Prepare a cash flow sheet for a yearly operation.
N. Develop a maintenance schedule for all equipment.
O. Operate snow packing vehicles, ski tows, and ice leveling machines.
P. Demonstrate proper fitting of skis and safety equipment.
Q. Demonstrate the correct method of making change.
R. Demonstrate the correct method of giving directions, greeting customers and asking questions.
S. Set up work schedules.
T. Develop rating sheets for student workers.
U. Develop an award system based on quantity and quality of work.
V. Demonstrate first aid procedures.

VI. Materials Needed

A. Books
1. *Standard First Aid Manual.* American Red Cross. 1 Red Cross Square, New York, New York.
B. Bulletins and Pamphlets
1. "Community Action for Recreation Development." University of Wisconsin-Extension.
2. Operator's manual for various equipment and machines used in your particular recreation area.
3. "Wisconsin Private Outdoor Recreation Survey 1966." Natural Resource Economic Division, Economic Research Division, USDA.
C. Films
1. Skiing-informative movies available from National Ski Patrol Association — Denver, Colorado.

PARLIAMENTARY PROCEDURE

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Understand and use basic parliamentary terms.
B. List the offices and describe the duties associated with the offices of an organization.
C. Use the gavel correctly.
D. Conduct a meeting.
E. Introduce an item of business.
F. Correctly state a motion to modify or change a question under consideration.
G. Refer an item of business to a committee.
H. Stop debate and call for an immediate vote.
I. Ask for a point of order.
J. Explain how to extend or limit the time of debate.
K. Describe the procedure to use to prevent a vote on a motion.
L. Demonstrate the technique used to consider a question a second time.
M. Describe the procedure to use to object to the consideration of a question.
N. State an appeal from the decision of the chair.
O. Properly ask for or gain parliamentary procedure information.
P. Properly handle a question of privilege.
Q. Withdraw a motion.
R. Call for the division of the assembly.
S. Set the time for a future meeting.
T. Dismiss a meeting.

II. Concepts to Develop

A. Business can be transacted in an orderly fashion when the rules of parliamentary procedure are followed.
B. Each member of an organization should know how to effectively participate in a meeting.
C. Each member of an organization should know how to properly conduct a meeting.
D. The rights of the minority must be protected while carrying out the will of the majority.

E. Meetings are strengthened when correct parliamentary procedure is practiced.
F. A knowledge of parliamentary procedure is essential to those who function as leaders of organizations.
G. The gavel is an instrument of authority.
H. Any member of an organization may introduce an item of business.

III. Subject Matter to Teach

A. The role of parliamentary procedure in the conduct of meetings.
   1. Purpose.
      a. Enable people to conduct business in an orderly fashion.
   2. Need for establishing a procedure for the conduct of meetings.
      a. Members know what to expect.
      b. Greater number of participants.
      c. Important items are not overlooked.
   3. Types of motions and their rank according to precedence.
      a. Privileged motions.
      b. Incidental motions.
      c. Subsidiary motions.
      d. Principal motions.
      e. Unclassified.
   4. Agenda — order of business.
      a. Call to order.
      b. Opening ceremony.
      c. Roll call or announcement of attendence.
      d. Officer reports.
         1) Secretary's report.
         2) Treasurer's report.
         3) Other officer's report.
   5. Committee reports.
   6. Unfinished business.
   7. New business.
   8. Closing ceremony.
   9. Adjournment.
   10. Recreation and refreshments.
   11. Special programs — can be inserted anyplace in the meeting which is convenient for the speaker.

B. Parliamentary terms — their meaning and use.
   1. Acclamation.
   2. Adjourn.
   3. Adopt.
   4. Agenda.
   5. Amend.
   6. Amendment.
   7. Appeal from the decision of the chair.
   8. Assembly.
   9. Ballot.
   10. By-laws.
   11. Chair.
   12. Consideration.
   13. Constitution.
   14. Convene.
   15. Convention.
   16. Debate.
   17. Debatable.
   18. Demand.
   19. Dilatory.
   20. Discussion.
   21. Disposition of a motion.
   22. Division of the assembly.
   23. Ex-officio.
   24. Expunge.
   25. Floor.
   26. General consent.
   27. Germane.
   28. Immediately pending question.
   29. Incidental motion.
   30. In order.
   31. Lay on the table.
   32. Main motion.
   33. Majority vote.
   34. Meeting.
   35. Minority vote.
   36. Move the previous question.
   37. New business.
   38. Nomination.
   39. Obtain the floor.
   40. Order of business.
   41. Parliamentary authority.
   42. Pending question.
   43. Plurality.
   44. Point of order.
   45. Precedence.
   46. Priviledged motion.
   47. Putting the question.
   48. Question.
   49. Question of privilege.
   50. Quorum.
   51. Recess.
   52. Rescind.
   53. Reconsider.
   54. Resolution.
   55. Second.
   56. Special committee.
   57. Standing committee.
   58. Standing vote.
   59. Tie vote.
   60. Two-thirds vote.
   61. Unanimous vote.
   62. Unfinished business.
   63. Voice vote.
   64. Withdraw a motion.

C. The development of awareness/proficiency in parliamentary procedure through simulated meetings
   1. Kinds of offices and the duties of each.
   2. Procedure for selecting officers.

3. Proper use of the gavel.
4. How to assume the position of the chair.
5. Proper procedure for obtaining the floor.
6. How to introduce an item of business.
7. The proper way of stating a motion to amend.
8. Ways to defer or delay action on a motion.
9. Referring an item of business to a committee.
10. Delaying an item of business for consideration at a specific time.
11. Stopping a debate and ordering an immediate vote on the question.
12. Limiting or extending the time of debate.
13. Procedure to use in suppressing a question.
14. Conducting business contrary to rules or by-laws.
15. Ways of preventing a vote on the motion before the assembly.
16. Procedure for considering a motion the second time.
17. Avoiding discussion of contentious or irrelevant questions.
18. Procedure to use in appealing the decision of the chair.
19. Calling the attention to a violation of rules or to a mistake in procedure — Point of order.
20. Method used by a member to gain parliamentary information.
21. Handling a concern which pertains to the welfare of the group — question of privilege.
22. Procedure used to withdraw a motion.
23. Requesting division of the assembly.
24. Determining when a member is out of order.
25. Developing a sensitivity to know when to adjourn or take a recess.
26. Methods to use in enforcing the rules of an organization.
27. Setting the time for the next succeeding meeting.

IV. Motivation

A. Films and filmstrips.
B. Attend business meetings of farm or other organizations to observe their proficiency in conducting a meeting.
C. Bulletin board displays.
D. Charts and transparencies relating to the use of parliamentary procedure.

V. Learning Activities

A. Compile a list of parliamentary terms, their meaning and how each is used.
B. Serve as a chairperson during a simulated meeting.
C. Prepare a written report of a committee meeting.
D. Deliver an oral report of a committee meeting.
E. Record minutes of a meeting and submit them to class members for their evaluation.
F. Compile a list of business organizations in the area, their offices and the duties associated with each office.
G. Introduce items of business, and participate in debate during simulated meetings.
H. Unit tests, lectures and discussions.
I. Team competition within the classroom.

VI. Materials Needed

A. Books, Bulletins and Pamphlets

1. *A Guide to Parliamentary Practices.* Interstate
2. *Helps in Mastering Parliamentary Procedure.* Stewart. Coop Print Shop, New Concord, Ohio 53752
3. *The How In Parliamentary Procedure.* Russell. National Farm Book Company. 1967.
4. *How To Hold a Better Meeting.* Snell. Harper and Brothers.
5. *Leadership Training and Parliamentary Procedure for FFA.* Gray & Jackson, Prentice-Hall.
6. *Mister/Madam Chairman.* Haugen. National Farm Book Company. 1963.
7. Office Manual for Future Farmers of America. National FFA Supply Service, Alexandria, Virginia 22309
8. *Parliamentary Procedure.* Sturgis McGraw-Hill Book Co.
9. *Parliamentary Law At A Glance.* Utter. National Farm Book Company, 1953.
10. *Practical Parliamentary Procedure.* Cruzan. McKnight and McKnight.
11. *Roberts' Rules of Order.* Roberts. Interstate and National Farm Book Company. 1971.
12. *Sturgis Standard Code of Parliamentary Procedure.* 2nd edition. McGraw-Hill Book Co.
13. *Unit Course Outline in Parliamentary Procedure.* State FFA Executive Secretary, Department of Public Instruction, 126 Langdon Street, Madison, Wisconsin 53702

14. *Workbook of Parliamentary Guide* for FFA. Vocational Agricultural Services, Teaching Materials Center, College Station, Texas 77843

B. Suggested Transparencies
1. FFA meeting room.
2. The different kinds of motions.
3. The correct procedure for nominations.
4. Ten basic rules of parliamentary procedure.
5. Opening and closing ceremonies of the FFA.
6. A summary of motions showing the kind of motion, whether a second is required, whether it is debatable, whether it is amendable, what type of vote is required, and the purpose.

C. Suggested Charts
1. The steps in making a motion, an amendment, and an amendment to the amendment.
2. The correct order of business.

D. Suggested Films
1. "Parliamentary Procedure." 2561. BAVI
2. "Parliamentary Procedures." 3624. BAVI
3. "Parliamentary Procedures in Action." 1627. BAVI

PASTURE MANAGEMENT

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Discuss the importance of pasture and pasture forage crops in Wisconsin.
B. List and discuss five advantages of a pasture.
C. Compare five common pasture forages.
D. Evaluate five common pasture crops found in Wisconsin.
E. Contrast methods of harvesting pastures.
F. Select the correct pasture crop for a given field situation.
G. Choose the practices necessary for establishing a pasture.
H. Describe the necessary steps in pasture renovation.
I. Explain five practices that reduce losses from winter killing.
J. Summarize three causes of nitrate poisoning.
K. Recall five precautions that must be taken to prevent bloat on pastures.

II. Concepts to Develop

A. There are career opportunities in plant science and pasture management for young men and women at all levels of educational preparation.
B. Forages harvested as pasturage provide the cheapest and most economical source of feed on the farm.
C. Mixtures of grasses and legumes are usually more productive than seedings of grasses or legumes alone.
D. Pastures can be kept productive if fertility needs are met and correct management practices are followed.
E. Pasture renovation is the establishment of superior grasses and legumes in thin unproductive sods of permanent pastures on hilly, erodable land without plowing.
F. Most forages used to provide pasturage deteriorate in feeding value as they approach maturity.
G. Yields of forage from grazed woodlands are very low and grazing by livestock eventually destroys the woods.
H. Grassland agriculture is a balanced system of farming designed to avoid waste of soil and fertility by erosion, and excessive plowing.

III. Subject Matter to Teach

A. History and importance of pastures.
1. Early development to present.
2. Advantages of pastures.

B. Establishing forages for pastures.
1. Seed bed preparation.
a. Within the crop rotation.
b. Renovation of permanent pastures.
2. Selection of plant varieties.
3. Lime and fertilizers to use.
4. Production goals desired.

C. Methods of harvesting pastures.
1. Grazing.
a. Rotational.
b. Strip.
c. Continuous.
2. Green chop.
3. Stored feeding.

D. Management practices and problems.
1. Burning.
2. Mowing.
3. Bloat.
4. Drought.
5. Winter kill.
6. Poisonous plants.
7. Nitrate Poisoning.

8. Insects.
9. Disease.

IV. Motivation
- A. Field trip to view farm pastures.
- B. Field trip to view pasture renovation.
- C. Bulletin board displays.
- D. Slides and films on pasture management.

V. Learning Activities
- A. Occupational experience programs.
- B. Renovate a small portion of a field.
- C. Collect and prepare a display of seeds.
- D. Prepare mounts of insects and diseases of pasture plants.
- E. Prepare displays and graphs depicting economics of good pasture management.
- F. Examine nutrient analysis taken of different pasture forages.
- G. Prepare charts and displays on poisonous plants, nitrate poisoning, and bloat.
- H. Develop a pasture improvement system for the student's home farm.

VI. Materials Needed
- A. Books
  1. Delorit and Ahlgren. *Crop Production.* Prentice Hall, 1973.
  2. Smith. *Forage Management.* Wm. C. Brown Book Co.
- B. Bulletins and Pamphlets
  1. "Forage Crop Varieties." University of Wisconsin - Extension Bulletin Room.
  2. "Pasture Renovation." Agronomy No. 18, Agriculture Extension, University of Minnesota, U. S. Dept. of Agriculture.
  3. "Pasture Renovation in Southwestern Wisconsin," University of Wisconsin-Extension.
  4. "Profitable Forage Production and Use." Rohweder. University of Wisconsin-Extension.
  5. "Weed and Insect Control in Forage and Small Grain." University of Wisconsin-Extension.
- C. Films
  1. "Look to Ladino." Suite 424, Southern Building, 1425 H. Street, N. W. Washington, D. C.
  2. "Cash in on Grass." Midland Cooperative, Inc. 739 Johnson Street, N. E. Minneapolis, Minn.

AGRICULTURAL PESTICIDES

I. Performance Objectives

Upon completion of this unit the student will be able to:
- A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in pest control and will be able to relate these factors to his/her own specific needs and aspirations.
- B. Read and interpret the terminology found on pesticide labels.
- C. Identify and discuss the need and importance of pest control on our American farms.
- D. List and discuss the significant highlights of the history and development of the agricultural chemical industry.
- E. List significant government legislation controlling the use and registration of agricultural pesticides.
- F. List the federal departments and agencies which are assigned to the regulation of pesticides.
- G. List the general groups of agricultural pests of most significance to the farmer.
- H. Use pesticides in a safe and prudent manner.
- I. Be familiar with the various chemical formulations for pesticides and the advantages and disadvantages of each.
- J. List the more important pesticides used in the students' area for the various crops grown.
- K. Be familiar with the application equipment used in applying pesticides.
- L. Properly calibrate the equipment used in applying pesticides.
- M. List places that information can be obtained on the use, applications, and laws regarding agricultural chemicals.

II. Concepts to Develop
- A. There are career opportunities in pest control for young men and women at all levels of educational preparation.
- B. Pesticides contribute significantly to farm production.
- C. Federal and state governments regulate the chemical industry.
- D. Pests are destructive to crops.
- E. Selection of the right pesticide is important.
- F. Each pesticide has its recommended method of application.
- G. Proper operation and care of application equipment include calibration.
- H. Pesticides must be used safely.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Common terminology
   1. Types of applications.
   2. Types of chemical pesticides.
   3. Agricultural chemical terms.
   4. Labels of pesticide products.

C. Common pests and importance of their control
   1. Insects.
   2. Plant and animal.
   3. Weeds.
   4. Rodents.

D. History of Pest Control
   1. Early development to present.

E. Government regulations
   1. Departments of federal and state governments involved.
   2. Federal and state legislation.
   3. New pesticides and how they are introduced.

F. Rules for safe use of pesticides

G. Demonstration of pesticide formulations
   1. Materials needed.
   2. Pesticide formulations.

H. Common pesticides used in the area
   1. Crops.
   2. Animals.

I. Application Equipment
   1. Sprayer parts.
   2. Sprayer calibration.

IV. Motivation

A. Field trip to chemical field plots.
B. Chemical field man class presentation.
C. Film and slide series.
D. Bulletin board displays.

V. Learning Activities

A. Occupational experience program.
B. Demonstrate chemical formulations.
C. Collect labels and other pesticide containers.
D. Discuss pesticides used on each student's farm.
E. Calibrate a field sprayer.
F. Collect various samples of sprayer parts.

VI. Materials Needed

A. Books
   1. Frear. *Pesticide Handbook.* College Science Publishers. 1972.

B. Bulletins and Pamphlets
   1. "Agricultural Chemicals" — Manufacturing Chemists' Association.
   2. "Our Struggle Against Pests" — U. S. Department of Agriculture. 1967.
   3. "Spray Application Guide" — Geigy Agricultural Chemicals.
   4. "Pesticide Lesson Plans for Vocational/Agriculture" — Geigy Agricultural Chemicals.

C. Films and Filmstrips
   The following are available from BAVI:
   1. "Chemical Conquest" — 1905
   2. "Let's Look at Weeds" — 3138
   3. "Pests or Plenty" — 1572
   4. "Safe Use of Pesticides" — 5688
   5. "Who Shall Reap" — 4383

PLANT GROWTH

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Categorize plants into the four phyla of the plant kingdom.
B. Classify common agricultural plants as monocotyledonous or dicotyledonous plants.
C. Draw and label the parts of both the corn and the bean seed.
D. Conduct and evaluate a germination test.
E. Demonstrate the process of osmosis.
F. Explain the chemical changes that take place during photosynthesis.
G. Discuss the requirements which must be met if the process of photosynthesis is to occur.
H. Write and explain the chemical formula for the process of respiration.
I. Discuss the importance of respiration in plant growth.
J. Draw and label the parts of a complete flower.
K. Explain the process of fertilization in plants.
L. Apply the methods of plant propagation.

II. Concepts to Develop

A. There are career opportunities in plant science for young men and women at all levels of educational preparation.
B. Seed vitality decreases with time.
C. The life cycle of a plant begins with the seed.
D. Large seeds can be planted more deeply than small seeds.
E. A knowledge of chemistry is essential to the understanding of photosynthesis.
F. Legumes can utilize nitrogen from the air.
G. The process of respiration is continuous day and night as long as the plant remains alive.
H. Considerable variation exists among different species of plants in the amount of water required for normal growth.
I. The water requirement of individual crop plants is greatly influenced by prevailing climatic conditions.
J. Plants grown on fertile soil use water more efficiently than those grown on poor soil.
K. Plants weakened by insects and disease are less efficient in their use of water.
L. Sixteen elements are required for plant growth.
M. Most crops are dependent on seed for reproduction.
N. Although flowers contribute much to the beauty and enjoyment of life, they are of even greater importance because of the seed they produce.
O. Pollination is accomplished in several ways.
P. Some plants are sterile to their own pollen and are dependent on insects for cross pollination and for the production of good yields.
Q. The time required to accomplish fertilization after the flower has been pollinated varies from less than an hour to over a day.

III. Subject Matter to Teach

A. Classifications of plants
   1. Need for classification.
   2. Development of the present classification system.
   3. Common and scientific names.
   4. Important families of agricultural plants.
   5. Agricultural crops belonging to the gramineae family.

B. Seed
   1. Main parts.
   2. The endosperm.

C. Germination
   1. Conditions needed for it to happen.
   2. Steps or changes which take place during the process.
   3. Location of the root, hypocotyl, and epicotyl.
   4. Stages in the germination and emergence of a bean plant.
   5. Define node and internode.
   6. Location of the food supply in seeds.
   7. Crops having an active hypocotyl.
   8. Crops having an inactive hypocotyl.

D. How Plants manufacture their foods
   1. Define photosynthesis.
   2. Conditions necessary for the process of photosynthesis to take place.
   3. Types of chlorophyll.
   4. Raw materials.
   5. Manufactured product.
   6. By-product of the process.
   7. Stages of photosynthesis.

E. Plant nutrients
   1. Define a plant nutrient, an element.
   2. Elements necessary for normal plant growth.
   3. The process of diffusion.
   4. The process of osmosis.
   5. Movement of nutrients within the plant.

F. Respiration
   1. Chemical reactions involved in the process.
   2. Respiration in higher forms of plant life.
   3. Surplus foods.

G. Water
   1. Its functions in the life of a plant.
   2. Meaning of the term "water requirement."
   3. Amount required by different species.
   4. The process of transpiration.
   5. Factors affecting the water requirement of plants.

H. Reproduction of Plants
   1. Methods of reproduction.
   2. Components of a complete flower.
   3. Characteristics and functions of the flower components.
   4. The similarities and differences of flowers.
   5. The production of pollen and its function.
   6. The process of pollination, self pollination and cross pollination.
   7. Steps or stages which take place from the time of pollination to fertilization.
   8. Define fertilization.

IV. Motivation

A. Bulletin board displays.
B. Films, filmstrips, slides and transparencies relating to plant growth.
C. Models showing parts of a flower.
D. Field trips to farms, gardens, or greenhouses to observe growing plants.

V. Learning Activities

A. Occupational experience programs.
B. Collect and prepare a display of common crop seeds.
C. Conduct experiments on seed germination, osmosis, and diffusion.
D. Dissect corn and bean seeds and identify their parts.
E. Collect and identify the different kinds of flowers and their parts.
F. Classify plants grown in the community.
G. Classify plants found in pictures and films.

VI. Materials Needed

A. Books
1. Aldrich. *Modern Corn Production.* S & A Publications. Station A, Box 2660, Champaign, Ill. 61820.
2. Aldrich. *Modern Soybean Production.* S & A Publications.

B. Films

The following films are available from BAVI — University of Wisconsin, Madison.

"Biology: Photosynthesis," 5553
"Flowering Plants and Their Parts," 6558
"Food From the Sun," 6472
"Garden Plants and How They Grow," 2956
"How Plants Reproduce," 4105
"Learning About Leaves," 4795
"Plant Growth," 1702
"Plants That Grow From Leaves, Stems and Roots," 5205
"Roots of Plants," 1879
"What Plants Need for Growth," 5117

POULTRY

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in poultry production and will be able to relate these factors to his/her own specific needs and aspirations.
B. Be familiar with poultry breeding and raising management.
C. Discriminate between good and poor laying house management.
D. Plan for profitable poultry production.
E. Understand the importance of sanitation, disease and parasite control.
F. Be familiar with the different areas of poultry enterprises.
G. Be familiar with modern poultry housing, feeding systems and other equipment.
H. Formulate modern feeding rations for different poultry types.
I. Understand the importance of a well organized marketing system.
J. Have an insight into the history of the poultry industry.
K. Analyze future trends of the poultry industry.
L. Evaluate the various poultry enterprises as farm enterprise selections.

II. Concepts to Develop

A. There are career opportunities in the poultry industry for young men and women at all levels of educational preparation.
B. Poultry production is a dynamic business employing new ideas as they are developed.
C. Proper feeding is a part of good management.
D. Automation and other types of labor saving equipment are important management decision areas.
E. Sanitation leads to healthy flocks.
F. The consumer demands a quality product.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job descriptions.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Baby chick management
1. Buying quality chicks.
2. Age to buy.
3. Importance of clean housing and equipment.
4. Types of brooder houses.
5. Brooding management.
6. Feeding.
a. Starter rations.

b. Growing rations.
c. Vitamins and minerals.

7. General management.
a. Control cannibalism.
b. Culling

C. Laying house management
1. Housing requirements.
a. Modern construction.
b. Ventilation.
c. Use of insulation.
d. Lighting.
e. Automation in feeding, watering, etc.
f. Arranging a good floor plan.
g. Cage vs. open systems.
2. Putting pullets in the laying house
a. Sanitation.
b. Types of litter.
c. Litter systems.
d. Culling.
e. Space requirements per hen.
3. Feeding and nutrition
a. Energy requirements.
b. Protein.
c. Vitamins & minerals.
d. Water.
e. Rations.
4. Flock health
a. Recommended vaccination programs.
b. Disease prevention programs.
c. Internal and external parasites.
d. Diseases.
5. Management considerations
a. Culling.
b. Broodiness.
c. Nesting.
d. Control of cannibalism.
6. Insuring egg quality
a. Frequent picking of eggs.
b. Storing eggs.
c. Grading & candling.
d. Marketing of eggs.

D. The broiler and poultry meat industry
1. Status of the broiler industry.
a. History.
b. Present broiler industry.
c. Future prospects.
2. Economics of industry
a. Efficiency of poultry as a meat source.
b. Housing costs and large capital needs.
c. Necessity of well organized marketing program.

E. The turkey industry
1. Present turkey industry.
2. Poult management.
3. Range management.
4. Marketing turkeys.

IV. Motivation

A. Field trip to hatchery.
B. Field trip to laying house.
C. Field trip to broiler or turkey processing plant.
D. Class presentation by poultry industry representative.
E. Bulletin board display.

V. Learning Activities

A. Occupational experience programs.
B. Laying hen culling demonstration.
C. Egg grading demonstration.
D. Conduct post mortem on birds.
E. Identify diseases and parasites on infected birds.
F. Demonstrate debeaking and caponizing.

VI. Materials Needed

A. Books
1. Bundy & Diggins. *Poultry Production.* Prentice Hall. 1961.
2. Card. *Poultry Production.* Lea & Febiger Publishers. 1961.
3. Ensminger. *Poultry Science.* Interstate. 1971.

B. Bulletins and Pamphlets
1. "Control Cannibalism in Poultry" Skinner & Hall. Univ. of WI - Extension.
2. "Diseases and Parasites of Poultry" Skinner & Haller. Univ. of WI - Extension.
3. "The Laying Flock" Skinner, Brevik, Gunde & Hall. Univ. of WI - Extension.
4. "Multiple-Story Poultry Houses" Annin, Hayes, Bruns & Witzel. Univ. of WI - Extension.

C. Films and Filmstrips
1. Film 10M "Development of the Chick" Univ. of WI. - Extension.
2. Film 12M "Getting Ready for Baby Chicks."
3. Film 11M "Poultry on the Farm."
4. Film 11M "Poultry Farm to Market."
5. Film 12M "Poultry Quality Eggs."
6. Slidefilm "How to do a Poultry Autopsy — Vocational Education Enterprises.
7. Slidefilm "Poultry Brooding Management." Vocational Education Enterprises.
8. Slidefilm "Poultry Selection & Judging." Vocational Education Enterprises.
9. Slidefilm. "Quality Eggs Part 1 and 2." Colonial Films.

SAFETY IN AGRICULTURE

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Develop a positive attitude toward the philosophy of safety.
B. Develop a philosophy that safety must be practiced everywhere all the time.
C. Identify potential hazards in agribusiness occupations and determine means for their elimination.

II. Concepts to Develop

A. Safety has been a part of national program planning from the beginning of our own country, and has contributed to its success and greatness today. Likewise, it would be a part of intelligent planning to include safety in success of any agricultural or other activity.
B. A constant awareness of safety is needed by all persons at all times.
C. A body of knowledge enables a person to recognize unsafe conditions and situations which contribute to accidents.
D. Safety practices should be a vital part of all community programs.
E. Continuous evaluation of safety programs are needed and adjustments made based on current and future needs.
F. All persons need to comprehend the gravity of accidents and the alternatives facing potential victims.
G. Students need to relate the nature of the accident to the kind of equipment being operated or activity engaged in.

III. Subject Matter to Teach

A. The need to observe safety at all times
   1. Farm tractor operation.
   2. Safe farm machinery operation.
   3. Farm shop.
   4. Farm home and buildings.
   5. Farm fire prevention.
   6. Rural traffic and transportation.
   7. Agricultural chemicals.
   8. Electricity.
   9. Livestock.
   10. Recreation.
   11. Natural disasters.

IV. Motivation

A. Field trip to farm.
B. Field trip to machine dealer.
C. Field trip to machine manufacturer.
D. Interview with an accident victim.
E. Demonstration by fire department.
F. Presentation by insurance representative.
G. Bulletin boards.
H. Mass media — newspaper, radio, T.V.
I. Law enforcement and traffic control personnel speak to class.
J. Bring in physician for an illustrated talk.
K. Tractor roll-over demonstration.
L. Attendance at safety seminars.
M. Survey the safety needs of your own community.

V. Learning Activities

A. Farm and home inspection program.
B. Elementary school, safety program.
C. Tractor operator contest.
D. Demonstrations.
E. Prepare an exhibit.
F. Demonstrate hearing protection equipment.
G. Demonstrate hard hats and their role in saving lives.
H. Demonstrate the use of fire extinguishers.
I. Students demonstrate small machine safety.
J. Participation in state and national safety programs.

VI. Materials Needed

A. Books
   1. Jones. *Shop Work On The Farm.* National Farm Book Co. 1955.
   2. Luening & Mortenson. *Farm Management Handbook.* National Farm Book Co., 1952.
   3. Phipps. *Farm Mechanics.* National Farm Book Co. 1960.
   4. Wakeman & McCoy. *Farm Shop.* National Farm Book Co. 1960.

B. Bulletins and Pamphlets
   1. "A Guide for Implementing The Federal Hazardous Occupations Order." Wisconsin Department of Public Instruction, 126 Langdon St., Madison, WI.
   2. "Farm and Home Safety Inspection Report." A2374. University of Wisconsin - Extension.
   3. "Farm Field Machinery." Finner, American Printing and Publishing Corp., 2909 Syene Road, Madison, Wisconsin 53713.
   4. "Farm Safety Handbook." Wisconsin Public Service Corporation.
   5. "Farm Safety Lessons." Jensen. Agriculture Engineering Dept., University of Wisconsin, Madison.
   6. "Farm Safety Review." National Safety Council, Chicago, Illinois.

7. "Fatal Farm Accidents in Wisconsin." University of Wisconsin - Extension.
8. "FFA At Work For Safety." National FFA Supply Service. Alexandria, Virginia.
9. "Fire Extinguishers For Farm and Home." Cir. 666. University of Wisconsin - Extension.
10. "Frequent Questions About the Occupational Safety and Health Act." University of Wisconsin - Extension.
11. "Hand Signals For Agriculture." A2478. University of Wisconsin - Extension.
12. "National FFA Chapter Safety Award Handbook." National FFA Supply Service.
13. "Plan to Meet Emergencies." Cir. 632. University of Wisconsin - Extension.
14. "Protect Your Hearing." University of Wisconsin - Extension.
15. "Resource Unit for Teaching Safe Farm Machinery Operation." Agriculture Engineering Dept., University of Wisconsin, Madison or the Dept. of Agricultural Engineering, University of Minnesota.
16. "Resource Unit for Teaching Safe Tractor Operation." Agriculture Engineering Dept., University of Wisconsin, Madison, or the Dept. of Agricultural Engineering, University of Minnesota.
17. "Rural Accident Prevention Bulletin." National Safety Council, Farm Department, 425 N. Michigan Ave., Chicago, Illinois 60611.
18. "Rural Wisconsin Accidents." A2375. University of Wisconsin - Extension.
19. "Safe Use and Storage of Flammable Liquids." FB2156. University of Wisconsin - Extension.
20. "Safeguard Your Farm Against Fire." FB2150. University of Wisconsin - Extension.
21. "Slow Moving Vehicle Emblem." Special Cir. No. 123, University of Wisconsin - Extension.
22. "Tornado! How To Protect Your Home and Family." Cir. 584. University of Wisconsin - Extension.
23. "Watch Your Step — Avoid Farm Accidents." FB 2101. University of Wisconsin - Extension.

C. Films, Filmstrips and Slides

Home

1. "Electrical Hazards in the Home." D. V. Jensen. Agricultural Engineering Dept., University of Wisconsin, 460 Henry Mall, Madison, WI 53706.
2. "Falls Aren't Funny." D. V. Jensen.
3. "How to Have a Family Home Fire Drill." D. V. Jenson.
4. "The Facts of Fire." D. V. Jensen.

Machinery

1. "Miscues With Machines." D. V. Jensen.
2. "Operating Farm Tractors & Machinery Efficiently and Safely." D. V. Jensen.
3. "Quick Identification Improves Road Safety on Farm Vehicles. D. V. Jensen.
4. "Tractor Tragedy." D. V. Jensen.
5. "Within the Frame of Safety." D. V. Jensen.
6. "Your Rural Road Challenge." Slides and script. D. V. Jensen.

Others

1. "Anhydrous Ammonia and Your Safety." The Fertilizer Institute.
2. "Awards Program for Youth Organizations." D. V. Jensen.
3. "Chance of a Lifetime." 7577. BAVI.
4. "Emergency Preparedness Information Card." EP-3. D. V. Jensen.
5. "Farm Petroleum Safety." Petroleum Council, 25 W. Main St., Madison, WI.
6. "Farm Safety Week," Pocket's. D. V. Jensen.
7. "Farm Tractor Safety." Petroleum Council.
8. "Gasoline Storage Demonstration." D. V. Jensen.
9. "Handle With Care." National Agriculture Chemical Association, 1155 - 15th Street, N. W., Washington, D. C. 20005.
10. "Handling Livestock Safely." USDA, Washington, D. C.
11. "He's Deaf—You're Blind." Ag-Tronic, Inc., P.O. Box 1106 Hastings, Nebraska. 68901.
12. "Mow in Safety." D. V. Jensen.
13. "Pesticide Safety on the Farm." D. V. Jensen.
14. "Planning for Emergencies." D. V. Jensen.
15. "Poison Perils." D. V. Jenson.
16. "Protecting Livestock From Radioacitve Fallout." D. V. Jensen.
17. "Safe Storage and Use of Flammable Liquids." D. V. Jensen.
18. "Safety Lessons for High School Teachers and Students." D. V. Jensen.
19. "What Do You Fall For?" D. V. Jensen.
20. "Year of Double Trouble." D. V. Jensen.

D. Other Sources of Health and Safety Films and Information.
   1. Bureau of Highway Safety, 1 W. Wilson St., 1121 State Office Building, Madison, WI 53702.
   2. J. I. Case Company, 700 State Street, Racine, WI 53404.
   3. Division of Health, Wisconsin Dept. of Health and Social Services, Box 309, Madison, WI 53701.
   4. Employers Insurance, Wausau, WI.
   5. Farm Film Foundation, Washington, D. C.
   6. Fifth U. S. Army, Central Audio Visual Center, Camp McCoy, Sparta, WI.
   7. General Motors, Public Relations Dept., 3044 Grand Blvd., Detroit, MI.
   8. Ideal Pictures, 4431 W. North Ave., Milwaukee, WI 53208.
   9. International Harvestor Co., 2572 University Ave., St. Paul, MN.
   10. National Association Automotive Mutual Insurance, Co., 20 N. Wacker Dr., Chicago, IL.
   11. National Commission on Safety Education, 1201 16th St., N. W., Washington, D. C.
   12. National Fire Protection Association, 60 Battery March St., Boston, MA.
   13. National Safety Council, 425 N. Michigan Ave., Chicago, IL.
   14. Wisconsin Council on Safety, 303 Place, Madison, WI. 53705.
   15. Wisconsin Public Service Corporation, Film Library, 600 N. Adams St., P.O. Box 700, Green Bay, WI 54301.
   16. Wisconsin Telephone Company, Consumer Relations Dept., 740 N. Broadway, Milwaukee, WI 53202.

E. Periodicals
   1. *Farm Safety Review.* National Safety Council, Chicago, IL.

SALES AND SERVICES, AGRICULTURE

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in agricultural sales and services and will be able to relate these factors to his/her own specific needs and aspirations.

B. Discuss and prepare a comparison chart on the four forms of business in the American free-enterprise system.
   1. Sole proprietorships
   2. Partnerships
   3. Corporations
   4. Cooperatives

C. Understand the values, interests, aptitudes, attitudes, and personal abilities required by his/her employer.

D. Write a letter of application, including a personal data sheet, to an employer of his choice.

E. Conduct a personal interview with a prospective employer.

F. Fill out correctly at least three different job application forms for employment.

G. Write a minimum of 200 words how sales and services relate to and its importance to our American economy.

H. Prepare a written outline and give an oral report of at least three minutes which illustrates the desirable qualities of a successful salesperson and/or service person.

I. Converse with another student on a selected topic for a pre-determined length of time.

J. Demonstrate correct telephone procedures and techniques.

K. Demonstrate proper techniques and procedures to use in a customer approach.

L. Demonstrate how a product and/or service should be presented to the customer.

M. List five reasons why potential customers resist buying and explain how to overcome each.

N. To close a sale. After hearing an oral sales presentation in the classroom, the student will discuss orally the point at which the close was initiated, and the methods used in its accomplishment.

O. Correctly complete at least ten sales tickets which includes entries, sales tax, and discounts if applicable.

P. Use ten correctly completed sales tickets, and without an error, make correct change for the amount of money presented.

Q. Write ten checks correctly, and understand the various types of endorsements, and how to scrutinize a check to see if they are O. K. to be accepted or cashed.

R. Identify, complete and explain the purposes of at least ten inventory forms, business invoices, packing slips, and bills of lading.

S. Determine the selling price of at least ten items using the various systems to determine mark-ups to arrive at the selling price.

T. Compute the cost of credit on at least ten items, filling in time-payment forms, and determine whether or not a customer is eligible for credit.

U. Prepare an attractive display of selected agricultural products.

V. Identify and evaluate the various fringe benefits offered by at least three different employers.

II. Concepts to Develop

A. There are career opportunities in agricultural sales and service for young men and women at all levels of educational preparation.

B. Post-high school training in agricultural sales and service is available in Wisconsin at several vocational technical schools and at three of our universities.

C. There are four ways of doing business in America and they all have several identifiable characteristics.

D. Employers have certain expectations, rules, regulations, etc., concerning their employees.

E. A properly written letter of application entails a great deal of thought, good grammer, interest and neatness.

F. Mental preparation, good grooming, promptness, attentiveness, good grammar usage, and interest are all important ingredients for a successful personal interview.

G. Neatness, accuracy, and the truth are of great importance in filling out an application blank for employment.

H. The sale of an item or items is of mutual benefit to both the salesperson and the customer.

I. Our economic system is dependent upon sales.

J. Salespersons must exhibit sincerity, dependability, integrity, loyalty, imagination, enthusiasm, courtesy and tact.

K. The only way confidence may be built up by a good salesperson is to practice and put to use good grammar, good voice tone, imagination, and pertinent and informative thinking.

L. Much business is transacted by the use of the telephone; therefore the user must know and accomplish the proper methods and usage of the telephone by speaking clearly, positively identify the person to whom he/she is speaking, and to accurately take down in writing what is to be accomplished.

M. All customers are different; therefore, different techniques need to be acquired and used. The salesperson has to know how to display enthusiasm, interest, ask questions, and answer questions, and how to handle negative attitudes and fault-finding.

N. One must develop the customer's interest in the product, cultivate his desire for the product, and relate the product to the customer's need.

O. Customers often offer resistance to buying because of price, quality, and style. A good salesperson must learn techniques to overcome their resistance.

P. In order to close a sale, the salesperson must obtain the customer's full attention and confidence.

Q. Sales tickets must be filled out accurately.

R. Making change must be done with 100% accuracy.

S. Checks and credit cards are a common method of paying for purchases.

T. Inventory forms, business invoices, packing slips, and bills of lading are important pieces of information and are used for various reasons.

U. There are various methods used to set selling prices of products above cost.

V. A substantial percentage of purchases are made via the use of credit; therefore a salesperson has to become well versed in figuring costs of credit by the various methods.

W. Attractive displays of products are appealing to the eye and lead to increased sales.

X. Fringe benefits should be fully understood, because they may be of greater importance than the initial salary or wage offered.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Vocational technical schools and universities in Wisconsin providing education in agricultural sales and services.
C. How American businesses are organized.
D. Human relations — employee-employer relations.
E. Characteristics of a salesperson and/or serviceperson.
F. Agricultural selling — agricultural service.
G. Mathematical calculations.
H. Determining selling prices.
I. Proper use of the telephone.
J. Store skills and procedures.
K. Meeting the customer.
L. Presenting merchandise and services to the customer.
M. How to close a sale.
N. Computing sales tickets.
O. Operation of adding machines — calculators.
P. Operation of a cash register — checking out at the end of the day.
Q. Handling money — checks — credit cards — making change.
R. Use of credit and contracts.
S. Merchandising — stocking — displaying.
T. How to find a job.
U. How to apply for a job.
V. Letters of application — data sheets.
W. Filling in job application forms.
X. Personal interviews.
Y. Securing work permits and social security cards.
Z. Unions — professional organizations — fringe benefits.

IV. Motivation

A. Field trips to various agribusinesses.
B. Guest speakers.
C. Charts, pictures, etc. on agricultural sales and services.
D. Bulletin board displays.
E. Merchandise displays put up by students.
F. Films, filmstrips, slides.

V. Learning Activities

A. Place students in centers for occupational experience.
B. Role-playing by students.
C. "Mock" store set-up whereby all students gain business experience.
D. Provide cooperative education program.
E. Utilize a shadow program in actual jobs.

VI. Materials Needed

A. Books, Bulletins and Pamphlets
   1. Resource Unit Agriculture — "Sales and Service." This booklet contains 117 sources of information in this unit.
      This booklet was developed by Vocational Agriculture Pilot Program Workshop — Wisconsin State University - River Falls, Wisconsin, July, 1971.
      Published by the Bureau for Career and Manpower Development, State Department of Public Instruction, 126 Langdon Street, Madison, Wisconsin 53702.

B. Instructional Media
   1. Bills of lading.
   2. Cash register.
   3. Check blanks.
   4. Daily business forms.
   5. Inventory forms.
   6. Loan forms — time payment forms.
   7. Packing slips.
   8. Sales tickets.
   9. Scales.
   10. Supplies to set up a "mock" store.
   11. Toy money (like used in primary grades).
   12. Visuals of all types.

C. Films
   1. "Customer and You: Get Organized." 7171. BAVI.
   2. "Customer and You: Getting the Decisions." 7170 BAVI.
   3. "Customer and You: Two-Way Communication." 7172 BAVI.
   4. "Motivation and Productivity: Management of Human Assets." 7174 BAVI.
   5. "Service Center for Industry." National Association of Manufacturers. Film Bureau, 277 Park Ave., New York, NY 10017.
   6. "Sales Retail: Sales Building Role." 6554 BAVI.

SHEEP PRODUCTION

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in sheep production, sheep science and will be able to relate these factors to his/her own specific needs and aspirations.

B. Name the leading states in sheep production.

C. List the advantages and disadvantages of the sheep enterprise.

D. Name the different wool classifications for sheep and identify the breeds in each classification.

E. Discuss the considerations necessary in selecting a breeding flock's foundation stock.

F. Identify the parts of a sheep.

G. List and discuss the various feeds suitable for feeding Wisconsin flocks.

H. Explain the differences in a ration designed for a ewe, lamb, and ram.

I. Formulate a sheep management plan including lambing, weaning, flushing, breeding, gestation, castrating, docking, eartagging, and shearing practices.

J. Understand the kinds of records necessary and their importance for profitable sheep production.

K. Discuss the shelter and equipment requirements for sheep production.

L. Explain the common sheep breeding programs.

M. Recognize the various internal and external parasites of sheep and discuss their life history, symptoms, prevention and treatment.

N. Discuss the diseases which pose the greatest problems to sheep, their cause, symptoms, prevention and treatment.

O. Explain the law of supply and demand as it relates to marketing meat and wool.

P. Describe the grades of slaughter lambs.

Q. Compare the different methods of marketing sheep.

R. Explain the factors which determine the value of wool.

S. Discuss the techniques in showing sheep.

II. Concepts to Develop

A. There are career opportunities in sheep science and production for young men and women at all levels of educational preparation.

B. To achieve the potential of each breed the sheep raiser must be familiar with their characteristics.

C. Profitable sheep production is dependent on the selection of prime foundation stock and correct management procedures.

D. Sanitation plays an important role in maintaining flock health.

E. Knowledge of the nutritional requirements of sheep is essential when implementing a feeding program.

F. Producer involvement in the marketing of meat and wool is essential.

G. Exhibiting quality animals is an effective means of advertising breeding stock.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job descriptions.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Opportunities in sheep production
   1. Advantages and disadvantages of sheep.
   2. Areas of sheep production.
   3. Determining the kind and size of operation.

C. Classes and breeds of sheep
   1. Classes.
   2. Breeds and their characteristics.

D. Selection of the breeding flock
   1. Considerations in starting a flock.
   2. Selecting a breed.
   3. Criteria for selecting individuals.

E. Feeding the flock
   1. Flushing.
   2. Feeding the pregnant ewe.

3. Lactation rations.
4. Feeding the breeding ram.
5. Creep rations.
6. Fattening rations.

F. Management of the flock
1. Breeding and reproduction.
2. Record keeping.
3. Planning a yearly activity list.
4. Culling the flock.
5. Lambing practices.
6. Docking, castrating, and eartagging.
7. Shearing.
8. Shelter and equipment.

G. Parasites and diseases
1. Life cycle or cause.
2. Symptoms.
3. Prevention and treatment.

H. Marketing meat and wool
1. Supply and demand.
2. Market grades.
3. Methods of marketing.
4. Determining the value of wool.

I. Fitting and showing sheep
1. Show classifications.
2. Feeding for the show.
3. Shearing and grooming.
4. Showing techniques.

IV. Motivation

A. Field trips to
1. Sheep farm.
2. Livestock show.
3. Judging contest.
4. Wool marketing facility.
5. Slaughter plant.

B. Films, filmstrips, and slides

C. Resource Speakers
1. Veterinarian.
2. Sheep buyer.

V. Learning Activities

A. Occupational experience program.

B. Collect and analyze various feedtags.

C. Group report on breeding systems.

D. Castrate a lamb.

E. Dock a lamb.

F. Label the parts of the sheep on a drawing.

G. Use a meat cutting chart to illustrate the components of a lamb carcass.

H. Keep a daily record of prices for market grades of sheep.

I. Make drawings of a housing and equipment layout for a specific flock size and type.

J. Balance rations for various classes of sheep using home grown and/or commercial feeds.

K. Prepare a bulletin board of breeds of sheep and meat and wool characteristics of each.

L. Demonstrate the shearing of a sheep.

M. Demonstrate the proper way to show a sheep.

VI. Materials Needed

A. Books
1. Bundy & Diggins. *Sheep Production.* Prentice-Hall, Inc. 1958.
2. Bundy & Diggins. Livestock and Poultry Production. Prentice-Hall, Inc. 1961.
3. Ensminger. *Sheep Science.* Interstate.
4. Marsh. *Sheep Diseases.* Williams and Wilkins.
5. Morrison. *Feeds and Feeding.* Morrison Publishing. 1961.

B. Bulletins and Pamphlets
1. "Adding to Your Income with Sheep." U.W. - Extension, Madison, WI.
2. "Docking, Castrating and Eartagging Lambs." U.W. - Extension.
3. "Feeding Lambs." University of Illinois.
4. "Housing and Equipment for Sheep." U.W. - Extension.
5. "Management Steps in Starting and Maintaining a Sheep Flock." U.W. - Extension.
6. "Profitable Sheep Production." U.W. - Extension.
7. "Story of Wool." American Wool Council.

C. Films and Filmstrips
1. "Breeds of Sheep" (Filmstrip), Vocational Agriculture Services. University of Illinois
2. "Fat Lamb Projects" (Filmstrip), Vocational Agriculture Productions, California.
3. "Grooming and Showing Sheep." (Filmstrip), NASCO. Fort Atkinson, Wisconsin.
4. "Judging Sheep." (Filmstrip), NASCO
5. "Selecting Breeding Sheep." Vo-Ag Services.
6. "Shearing Sheep." (Filmstrip), NASCO

D. Laboratory Manuals
1. 1973 *Livestock Production Manual.* Sheldon Book Co. Sheldon, Wisconsin.

SMALL GAS ENGINES

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the agricultural power industry and will be able to relate these factors to his/her own specific needs and aspirations.

B. Be familiar with small gas engine components, terminology, and principles of operation.

C. Employ fundamental skills and knowledge necessary to perform preventative maintenance, utilize diagnostic procedures, and tune-up operations on small gas engines.

D. Perceive shop safety, and the proper use of mechanics' tools and equipment.

E. Interpret shop manuals to locate specifications and parts books to order replacement parts.

F. Overhaul major small gas engines.

II. Concepts to Develop

A. There are career opportunities in agricultural power for young men and women at all levels of educational preparation.

B. Safety is an attitude that needs to be developed and practiced.

C. As all engines function, they employ basic principles of operation.

D. Preventative maintenance on small engines is a good and necessary practice.

E. All tools have proper uses.

F. Each mechanized task has a suggested procedure.

G. Manuafacturer's manuals and parts books are sources of important information.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job descriptions.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Shop tool identification and proper application
   1. Hand tools.
   2. Power tools.

C. Fasteners and torque wrenches
   1. Fastener and thread identification.
   2. Application of torque wrenches.

D. Shop equipment operation
   1. Cleaning equipment.
   2. Reconditioning equipment.

E. Shop safety
   1. Eye safety and appropriate dress.
   2. Housekeeping.
   3. Shop rules and attitude.

F. Engines — principles of operation and identification
   1. 4-stroke cycle.
   2. 2-stroke cycle.

G. Engine component identification
   1. Stationary and moving parts.

H. Small gas engine preventative maintenance programs
   1. Cooling systems.
   2. Engine cleaning procedures.
   3. Air cleaners — breathers.
   4. Lubrication systems.
   5. Fuel selection — use — storage.
   6. Plug service.
   7. Carburetor service.
   8. Compression checks.
   9. Battery service.

I. Engine starting and operation
   1. Starting procedures.
   2. Operating procedures.
   3. Engine operated equipment safety.

J. Engine storage
   1. Importance of proper storage.
   2. Engine protection procedures.

K. Small gas engines — diagnostic procedures
   1. Ignition.
   2. Carburetion.
   3. Compression.

L. Service manuals — parts books — service records
   1. Engine specifications.
   2. Parts catalogs.
   3. Service and business records.

M. Measuring instruments
   1. Micrometers.
   2. Calipers.
   3. Gauges.
   4. Speed measuring tools.

N. Major small gas engine maintenance and repair
   1. Shop procedures and workmanship.
   2. Starters.
   3. Ignition systems.

4. Fuel systems.
5. Governors.
6. Valves.
7. Cylinders and piston rod assemblies.
8. Lubrication systems.
9. Cam and crank assemblies.

O. Power transmission systems
1. V-belts — sheaves.
2. Chains — sprockets.
3. Gears.
4. Bearings.
5. Clutches.

P. Mower blade sharpening
1. Removal — inspection.
2. Sharpening — balancing.

IV. Motivation

A. Family — student engines utilized in laboratory.
B. Slides, filmstrips, transparencies presented.
C. Trouble shooting contests.

V. Learning Activities

A. Occupational experience program.
B. Tool, equipment, instrument, fastener identification and application.
C. Safety instruction.
D. Engine principles and parts.
E. Engine tune-up laboratory.
F. Engine troubleshooting contests.
G. Engine overhaul laboratories.
H. Service specification and parts ordering laboratory.
I. Measurements laboratory.
J. Mower blade sharpening.

VI. Materials Needed

A. Books
1. *Small Engines - Care and Operation.* Volume I. American Association for Vocational Instructional Materials (AAVIM) 1971.
2. *Small Engines - Maintenance and Repair.* Volume II. AAVIM. 1971.

B. Bulletins and pamphlets
1. "General Theories of Operation." Briggs and Stratton Corp.
2. "Repair Instructions IV." Briggs and Stratton Corp.
3. "Shop Tools — Fundamentals of Service." John Deere.

C. Visual Aids — Filmstrips
1. "Using Power Lawn Mowers Safely." NASCO. Fort Atkinson, Wisconsin.

D. Visual Aids — Slides
1. "Complete Overhaul — 6 and 8 cubic inch Aluminum Alloy Engines." Briggs and Stratton Corp.
2. "Engine Check-up Class — 6 and 8 cubic inch Aluminum Alloy Engines." Briggs and Stratton Corp.
3. "Micrometers." Schuster Productions.
4. "Start, Stop, Store." Briggs and Stratton Corp.
5. "Taps and Dies." Schuster Productions.
6. "Valve and Seat Reconditioning." Briggs and Stratton Corp.

E. Visual Aids — Transparencies
1. "Small Engines." Vocational Agriculture Service.
2. "2-Stroke Cycle." 3-M Company.
3. "4-Stroke Cycle." 3-M Company.

F. Laboratory Manuals
1. *Briggs and Stratton Parts and Service Data Manual.*
2. *Kohler Engines Service Manual.*
3. *Small Engines Service Manual.* Interstate.
4. *Small Gas Engines - A Laboratory Guide For Teachers.* VEP. Vocational Education Publications. California State Polytechnic College.

SMALL GRAINS

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the production of small grains and relate these factors to his/her own specific needs and aspirations.
B. Identify seeds of the various small grains.
C. Grade small grains and judge them.
D. List and discuss the soil and climatic requirements of small grains.
E. Describe the important uses of the small grains both for feed and commercial use.
F. Select the varieties of grain suited to a particular area.
G. Explain the cultural practices for small grain production.
H. Compare the weights per bushel, nutritive value, T.D.N. protein, and bushels per acre.

I. Identify five diseases and pests of small grains and discuss recommended control measures.

II. Concepts to Develop

A. There are career opportunities in small grain production and plant science for young men and women at all levels of educational preparation.
B. Species of small grains vary in their nutritional value.
C. Small grains are grown for a variety of uses.
D. Knowledge of plant and seed characteristics is essential for proper identification.
E. Climate and soil requirements must be considered when selecting the species of small grains to be grown.
F. Recommended cultural practices help to assure a good yield.
G. Knowledge of harvesting, storing and marketing techniques are essential ingredients in profitable small grain production.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment information.
   2. Job descriptions.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relative to potential employment.
B. Identification of the small grains and grading
C. Climatic and soil requirements for small grains
D. Importance and uses of small grains and marketing
E. Cultural practices
   1. Seed treatment and testing.
   2. Seedbed preparation.
   3. Time of planting.
   4. Rate of seeding.
   5. Disease and pest control.
   6. Harvesting practices.
   7. Yields and weights.
   8. Storage and marketing.

IV. Motivation

A. Field trips to area farms.
B. Field trips to elevators and seed houses.
C. Slides on diseases and pests.
D. Films and filmstrips.
E. Bulletin board displays.

V. Learning Activities

A. Collect and identify small grain samples.
B. Prepare mounts of small grains.
C. Collect and display head samples of diseased small grains.
D. Treat a small grain sample for disease control.
E. Prepare a report on the various storage methods.
F. Study statistical reports.

VI. Materials Needed

A. Books
   1. Bear, et. al. *Hunger Signs in Crops.* American Society of Agronomy, Washington, D. C.
   2. Brickbauer & Mortenson. *Approved Practices in Crop Production.* Interstate.
   3. Delorit & Ahlgren. *Crop Production.* 4th ed. Prentice-Hall. 1973.
   4. Hughes, et. al. *Crop Production.* MacMillan. 1957.
   5. Wilson. *Producing Farm Crops.* National Farm Book Co.
B. Pamphlets and Bulletins
   The following are available from the University of Wisconsin - Extension.
   1. R1913, "Barley" (B 572)
   2. A1583, "Common Barberry Spreads Stem Rust" (C 474)
   3. A2296, "Field Crops Herbicide Manual" (MA - 3)
   4. R2141, "Holden and Portal Oats, Performance and Breeding" (B 594)
   5. A2471, "How to Produce Small Grains"
   6. A2038, "Oat Seed Quality and Seeding Practices"
   7. A1929, "Oat Varieties"
   8. R1733, "Oats, Cultures and Varieties" (B 540)
   9. A1453, "Seed Treatments to Control Small Grain and Forage Diseases"
   10. IN AE67A, "Selecting a Grain Drying Method"
   11. R1782, "Small Grain Variety Performance in Wisconsin" (B550)
   12. A1902, "The Soil Survey"
   13. A2402, "Spring Wheat Varieties for Wisconsin"
   14. R2220, "Timwin and Kenosha Winter Wheats — Performance and Breeding" (B 599)
   15. A1981, "Weed and Insect Control in Forages and Small Grains"
   16. NCXP36A, "Weeds of the North Central States"
   17. A2421, "Wild Rice Processing in the Upper Great Lakes Region"

18. A2413, "Winter Wheat in Wisconsin"

C. Periodicals
1. *Crops and Soils*
2. *Doane's Agricultural Report*
3. *Drovers Journal*
4. *Farm Journal*
5. *Farm Technology*
6. *Successful Farming*
7. *Wisconsin Agriculturist*
8. *Wall Street Journal*

D. Films and Filmstrips
1. "Origin of Wheat," 3164, BAVI
2. "Pests or Plenty," 1572, BAVI
3. "Seeds and Science — The Western Story," 1554, BAVI
4. "Seeds of Plenty," 7696, BAVI
5. "Stem Rust — Airborne Enemy of Grain," 2099, BAVI
6. "Wheat Rust," 5120, BAVI
7. "Who Shall Reap," 4383, BAVI

SOILS, ADVANCED

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in soil science and will be able to relate these factors to his/her own specific needs and aspirations.
B. Understand what soil is, and how it was formed.
C. Use the terminology of soil science.
D. Categorize the trends and sequences in the development of soils in the area.
E. Recognize the soil classes of the area by visual inspection.
F. Distinguish by appearance glacial indicators such as kames, drumlins and eskers.
G. Determine the best use of area soils.
H. Contrast the eight land capability classes.
I. Recognize the soil's structure, texture, and color.
J. Select land practices to be used on different soil types.
K. Visualize how the great glaciers moved.
L. Value soil as a great resource.
M. Discuss the relationship of the soil to the community.
N. Recognize mineral deficiency symptoms in plants.
O. Compare soil conservation practices.
P. Discuss the sources of the nutrients.
Q. Write a paragraph on each essential nutrient and the function each performs in the plant.
R. Calibrate a fertilizer applicator.
S. Select the amount and kind of fertilizer to be used based on a soil test, the crop to be grown, and the expected yield.
T. Perform a tissue test.
U. Utilize mathematics to change oxides to elemental forms, and back, with special emphasis on the ability to evaluate fertilizer as to cost per unit.
V. Compare different methods of applying fertilizer.
W. Constrast the forms of commercial fertilizers.
X. Explain the ways fertility is lost.
Y. Conclude why certain fertilizer nutrients do or do not leach readily into the soil.
Z. Compare the various rates of solubility in relationship to the different forms of fertilizer.
AA. Associate the chemical abbreviation with elements contained in the fertilizer.
BB. Constrast the effects of pH on the availability of nutrients.
CC. Write a paragraph describing the physical and chemical properties of fertilizers.
DD. Explain what pH measures.

II. Concepts to Develop

A. There are career opportunities in soil science for young men and women at all levels of educational preparation.
B. The formation of soil is a slow and continuous process.
C. Soil is one of our most precious resources, for without it, plant and animal life could not exist on this planet.
D. Each type of soil has unique characteristics.
E. Soils formed under grasses are the most fertile.
F. A positive relationship exists between the organic matter content of a soil and its level of fertility.
G. A positive relationship exists between the organic matter content of a soil and its water holding capacity.
H. A soil's nutrient level must be replenished to the extent that elements are removed by plants.
I. Soils which are deficient in plant food are more subject to erosion than those

which have received adequate amount of nutrients.

J. Plants differ in their response to pH.

K. Each of the sixteen elements needed for plant growth serves a unique purpose.

L. Properly inoculated legumes can utilize nitrogen from the air.

M. Microorganisms function best in soils which are neutral.

N. Capillary water is the only form of soil moisture which is available to plants.

O. Land forming is an effective method of controlling surface water on soils which are poorly drained.

P. Land classification is an aid in determining its best use.

Q. Every person needs to be concerned about soil and water conservation.

R. The tissue test is a valuable aid in detecting the deficiencies of elements.

S. Crops vary in their nutrient requirements.

T. Most soils are deficient in several elements.

U. Certain discolorations in plants indicate that a specific element is lacking.

V. Some fertilizers leach more readily than others.

W. The solubility of commercial fertilizers varies.

X. High crop yields over a period of time can not be realized without the generous use of commercial fertilizers.

Y. A bag of fertilizer is not all plant food.

Z. Some crops require several applications of commercial fertilizer during the growing season.

AA. All decisions concerning the applications of commercial fertilizer should be based on a current soil test and the availability of funds.

BB. All cropland should have a soil test at least once during the rotation.

CC. The machine processed soil test report contains much useful information.

DD. Fertilizers can be blended to match the results of any soil test.

EE. Fertilizers are available in several forms, therefore, specialized equipment is needed for their application.

FF. The law of diminishing returns becomes evident when generous amounts of fertilizer are applied.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job descriptions.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Development of soils
1. As a result of water, wind, glaciers, forests, grasses.
2. The great orders of soil.
3. Characteristics of a soil horizon.
4. Major factors used in describing soils and soil horizons.
5. Soil groups of the United States, their development and characteristics.
6. Soil chemistry.

C. Organic matter and its relationship to soil fertility.
1. What is organic matter?
2. The importance of organic matter.
3. Methods used to increase or maintain the organic matter of the soil.
4. The carbon-nitrogen ratio.

D. Life found in the soil
1. Importance of microorganisms in the soil.
2. Kinds of microorganisms in the soil.
3. Other forms of life in the soil.
4. The nitrogen fixation process.
5. The process of inoculating legumes.
6. Benefits derived from inoculating legumes.
7. Harmful effects of soil microorganisms.
8. Factors which favor the growth and activity of soil microorganisms.
9. Soil management practices and its relationship to the activity of microorganisms.
10. Higher forms of animal life in the soil and their effect in the soil.

E. Water in the soil
1. The importance of water in soil formation and plant growth.
2. Types of water in the soil.
3. Ways water enters and moves in the soil.
4. Adhesion and cohesion.
5. Classes of soil, water and their availability to plants.
6. Water holding capacity of soils.
7. Methods used to determine the moisture content of soils.
8. The importance of proper water management.
9. Methods of increasing available water to crops.
10. Methods used to reduce water losses from the soil.

F. Plant growth
   1. The life process of plants.
   2. Components of a cell — their composition and function.
   3. Describe the following:
      a. Photosynthesis
      b. Transpiration
      c. Respiration
      d. Digestion
      e. Assimilation
      f. Growth and reproduction
   4. Functions of the root system.
   5. Development of roots.
   6. Types of root systems.
   7. Extent of the root system.
   8. Types and functions of stems.

G. Environment and its effect on plant growth
   1. Heredity factors.
   2. Crop environment.
      a. The effects of light.
      b. The effect of temperature on the growth of plants.
      c. Soil moisture supply and its effect on plant growth.
      d. Effect of humidity, precipitation and wind on plant growth.
      e. The need for air in the soil.
      f. The effect of soil texture, structure, fertility and soil reaction on plant growth.
      g. The effect of weeds.
      h. The effect of insects and diseases on plant growth.

H. Elements necessary for plant growth
   1. Elements needed for plant growth which are obtained from the air — the importance of carbon dioxide.
   2. Elements needed for plant growth which are obtained from water.
   3. Major elements obtained from the soil — deficiency symptoms — their effect on plant growth — means of replenishing the supply in the soil.
      a. Nitrogen
      b. Phosphorous
      c. Potassium
      d. Calcium
      e. Magnesium
   4. Trace elements needed for plant growth — deficiency symptoms — their effect on plant growth — means of replenishing the supply in the soil.
      a. Iron
      b. Boron
      c. Manganese
      d. Copper
      e. Molybdenum
      f. Chlorine

I. Soil reaction and liming
   1. The need for understanding the ionization of molecules.
   2. Define an ion, a molecule, an electron and a cation.
   3. Means of expressing soil acidity and alkalinity.
   4. Colloids and soil reaction.
   5. Tests used to determine soil reaction.
   6. The development of acid and alkaline soils.
      a. Range of reaction in soils.
      b. Seasonal effects on soil acidity.
   7. Soil reaction and its effect on plant growth.
      a. Plants which favor a weak acid or neutral soil.
      b. Plants which will tolerate a moderately acid soil.
      c. Plants which will tolerate an acid soil.
   8. Liming the soil
      a. Ways liming material became deficient in the soil.
      b. The function of lime in the soil.
      c. Benefits derived from adding lime to the soil.
      d. Lime materials and their value in terms of calcium equivalents and the rapidity with which they correct soil acidity.
      e. The application of liming materials.
         1) Time of application.
         2) Method of application.
         3) Rate of application.
         4) Factors which determine the amount of lime needed to obtain the desired pH.

J. Commercial fertilizers
   1. Reasons why commercial fertilizers are applied.
   2. Types of commercial fertilizers available.
   3. How commercial fertilizers are sold.
   4. The meaning of grade.
   5. Information contained in the guaranteed analysis.
   6. Major and minor elements contained in commercial fertilizers.
   7. Amount of commercial fertilizer to apply.
      a. Rates for maximum yields
      b. Rates for maximum profits.
   8. Time of application.
   9. Fertilizer placement.
      a. Banding.
      b. Side dressing.
      c. Drilling in with the seed.

d. Plow sole application.
e. Broadcasting.
f. Spreading with manure.

10. Kinds of commercial fertilizer
    a. Nitrogen fertilizer.
        1) Sulfate of ammonia.
        2) Nitrate of soda or sodium nitrate.
        3) Ammonium nitrate.
        4) Anhydrous ammonia.
    b. Phosphate fertilizers.
        1) Rock phosphate.
        2) Super phosphate.
    c. Potash fertilizers.
        1) Nitrate of potash.
        2) Sulfate of potash.
11. State laws which apply to commercial fertilizers.

K. Animal manure and its effect on soil fertility.
1. Value of manure in maintaining soil fertility.
2. Fertilizer content of manure produced by farm animals.
    a. Cattle.
    b. Hogs.
    c. Sheep.
    d. Horses.
3. Influence of bedding and feed on the fertilizer content of manure.
4. Methods used to conserve the elements contained in barnyard manure.
5. Methods of handling manure.
6. Methods of applying manure.
7. Rates of application.
8. Crops and soils which are most benefitted from an application of manure.

L. Land drainage and its affect on land use
1. Effects resulting from too much water and prolonged wetness.
    a. Root growth.
    b. Tilth.
    c. Cultural practices.
    d. Costs.
2. Drainage methods
    a. Surface drainage.
        1) System of ditching and design.
        2) Effectiveness.
        3) Soil cover, land slope and condition of soil.
        4) Preventing erosion.
        5) Ditch construction.
    b. Subsurface drainage
        1) Where used.
        2) Types of systems.
        3) Tile — location of drains, size of tiles, selection, construction of tile drains, depth and spacing of tile.
3. Maintaining drainage systems
    a. Importance of keeping ditches free of refuse, weeds, trash, brush and silt.
    b. Sod outlet ditches and their effect on maintenance costs.
    c. Inspection and care of tile drainage systems.
    d. Effects of continuous cropping on tile drainage systems.

M. Soils and water conservation
1. Types of erosion
    a. Wind
    b. Water
2. Changes in the landscape due to erosion.
3. Agricultural practices which permit erosion.
    a. Overgrazing
    b. Plowing and working up and down the slope rather than on the contour.
    c. Tilling soil of low fertility.
    d. Failure to maintain proper organic matter content of the soil.
    e. Removal of natural vegetation from the forest.
    f. Exposure of the soil on sloping land.
    g. Breaking up land which is susceptible to erosion.
4. Effects resulting from erosion
    a. Reduced crop yields.
    b. Greater need for commercial fertilizer.
    c. Crops of lower nutritive value.
    d. Loss of topsoil.
    e. Formations of ditches and gulleys.
    f. Siltation of lakes and streams.
    g. Covering topsoil with lower fertility soils from highlands.
5. Extent of erosion in the United States
    a. Land area of the U.S.
    b. Percent damaged by erosion.
    c. Losses caused by erosion.
6. Conservation programs in the United States
    a. Historical background.
        1) George Washington, Thomas Jefferson, U. S. Grant, Theodore Roosevelt, Franklin D. Roosevelt, Hugh Bennett, O. R. Zeasman, J. Stirling Morton.
    b. Present soil and water conservation activities.
        1) Soil conservation districts — function and operation.
        2) Assistance provided by business and industry.

3) Grassland farming.
4) Tree farming — shelterbelts, windbreaks and woodlots.
5) Terracing.
6) Strip cropping.
7) Land forming.
8) Crop rotation.
9) Ponds and dams.

N. Ecology and its relationship to soil use
1. The ecosystem.
a. Members of the ecosystem.
b. Checks and balances.
c. The effect of change.
2. Man and the soil.
a. Man's affect on the soil.
b. Reaction of the soil to man's presence.
3. Balance of nature.

IV. Motivation

A. Field trips
1. Land features of the area.
2. Visit area farmers to view conservation practices.
3. View wildlife conservation areas.
4. Visit watershed management area.

B. Soil conservation class presentation by SCS personnel.

C. State Park Service Ranger class presentation.

D. Bulletin board displays.

E. Slide series of glaciation and glacial features.

F. Demonstrate the properties of pure phosphorous and potassium.

G. Complete soil science experiments by group and demonstrate to class. (Suggested experiments in soil science are prepared by California State Polytechnic College. Others can be taken from various soils units.)

V. Learning Activities

A. Occupational experience programs.

B. List conservation activities presently carried on at home and develop for needed plan of action for needed improvements.

C. Collect and test soil samples.

D. Fertilizer demonstration test plots.

E. Evaluate a conservation plan of the entire SCS district.

F. Develop a conservation plan for your district.

G. Participate in local and state land judging contests.

H. Titrate a sample of lime.

I. Use a sample IBM soil report and write recommendations for corrective and maintenance applications.

J. Complete work sheets on fertilizer arithmetic.

K. Collect and display plant specimens which show plant nutrient deficiencies.

L. Calibrate the fertilizer applicator on a corn planter.

M. Calibrate a broadcast fertilizer applicator.

VI. Materials Needed

A. Books
1. Buckman & Brady. *The Nature and Properties of Soil.* 1969.
2. Donahue. *Our Soils and Their Management.* Interstate. 1970.
3. Knute, Korpi, Hide. *Profitable Soil Management.* Prentice-Hall. 1969.
4. Stallings. *Soil Use and Improvement.* Prentice-Hall. 1957.
5. Walsh & Beatty. *Profitable Management of Wisconsin Soils.* University of Wisconsin. Agriculture Dept. Madison, Wisconsin.

B. Bulletins and Pamphlets
1. "Conquest of the Land Through 7,000 Years." USDA, Washington, D.C.
2. "Know Your Soil." USDA
3. "Let's Stop Soil Erosion." ARC 613
4. "Microorganisms." No. 955 USDA, 1964
5. "Our Land and Its Care." National Plant Food Institute
6. "Planning a Sound Land Use Program." UAS 2003
7. "Soils and Water Conservation in Wisconsin." USDA

C. Films
The following are available from BAVI — University of Wisconsin, Madison.
1. "Adventures of a Junior Raindrop," 0022
2. "Grass Roots in the Soil," 3537
3. "How Scientists Study the Soil," 5462
4. "Land Forming," 4235
5. "Life in a Cubic Foot of Soil," 5677
6. "Our Soil Resources," 2044
7. "Raindrops and Soil Erosion," 1812
8. "Plants and Their Importance," 1682
9. "Problems of Conservation: Soil," 7600
10. "What's Happening to Our Landscape?" 6366
11. "Conserving Our Soil Today." Coronet.
12. "Erosion Leveling the Land." Encyclopedia Brittanica Films.
13. "Problems of Conservation." Encyclopedia Brittanica Films.
14. "The Story of Soil." Coronet.
15. "What is Soil?" Encyclopedia Brittanica Films.

D. Filmstrips
   1. "Agriculture Zoning and Land Use Planning." Vo-Ag Visuals, New Holland, Pa.
   2. "Irrigation in Review," Vo-Ag Visuals.
   3. "Pollution in Review," Vo-Ag Visuals.
   4. "Soil Conservation in Review," Vo-Ag Visuals.
   5. "Soil Science Transparencies," Vocational Agriculture Service, Illinois.
   6. "Soil Tests in Review," Vo-Ag Visuals.

SOILS, BASIC

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the field of soil science and will be able to relate these factors to his/her own specific needs and aspirations.
B. Determine soil texture.
C. Understand soil origin, make-up and the interrelation of plants and soils.
D. Contrast the eight land capability classes.
E. Discuss the importance of fertilizers, how they are applied and explain the label on a fertilizer bag.
F. Use soil maps and explain their utility.
G. Realize the need for soil conservation practices and possess a practical knowledge of ecology.
H. Take a representative soil sample.
I. Recognize the difference in soil structure, texture and color.

II. Concepts to Develop

A. There are career opportunities in soil science for young men and women at all levels of educational preparation.
B. The understanding of basic soil properties is essential for proper land use.
C. Soil is essential for the production of food, fiber, and shelter.
D. Understanding the importance of soil conservation is essential for the welfare of all citizens.
E. A meaningful test result is an outcome of proper soil sampling.
F. Machine processed soil test reports contain much useful information.
G. Serious ecological problems surface when soil conserving practices are not followed.
H. The formation of soils is a slow and continuing process.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job description.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.
B. Origin of the Soil
   1. What is soil?
   2. The process of soil formation.
   3. Materials and processes of soil development.
   4. Movement of soil materials by glaciers, water, wind, and gravity.
   5. Shapes and sizes of structural soil units.
   6. Soil properties — texture, structure and tilth.
   7. Chemistry of the soil.
C. Determining Soil Fertility Through Testing
   1. Purpose of utilizing a soil test.
   2. Reasons for having the soil tested.
   3. Reliability of soil tests.
   4. Tests used for determining various soil nutrients.
   5. Soil sampling procedures.
      a. Importance of obtaining a representative sample.
      b. Procedure for obtaining a representative sample.
      c. Equipment needed for soil sampling.
      d. Record keeping.
   6. Availability and reliability of soil testing kits.
   7. Interpretation of machine processed records.
D. Fertilizers
   1. Basic types.
   2. Fertilizer labels —
      a. Information found on the label.
      b. Interpretation of information.

3. Application of fertilizer.
   a. Soil test and its relationship to analysis and rate of application.

E. Land capability
   1. Factors causing land to be classified in one of eight classifications.
   2. Relating soil classification to land use.

F. Soil mapping
   1. The need for soil maps.
   2. Procedure for mapping soil.
   3. Manner in which soil maps are used.

IV. Motivation

A. Demonstrations — porosity test, capillary action, osmosis, organic matter and water runoff relationship.

B. Lectures presented by area SCS personnel.

C. Field trips to
   1. Sample a field.
   2. Tour area to view erosion and conservation practices.

D. Bulletin board display.

E. Slides, film strips, overlays and films.

V. Learning Activities

A. Occupational experience program.

B. Use soil analysis sieves.

C. Take a soil sample, record information, send to state soils laboratory.

D. Locate parent's farm on a soil map, and determine the major soil type, per cent erosion, slope and decide what each soil type can best be used for on the basis of information provided in the soil survey and also from the knowledge attained from earlier classes.

E. Form demonstration groups and demonstrate concepts learned in class.

F. Test soil in school laboratory.

G. Reports or short speeches on a soil topic.

H. Soil judging at school site pit.

VI. Materials Needed

A. Books
   1. Donahue. *Our Soils and Their Management.* Interstate. 1970.
   2. Foth & Turk. *Fundamentals of Soil Science.* J. Wiley & Sons. 1966.
   3. Knute, Korpi & Hide. *Profitable Soil Management.* Prentice-Hall. 1969.

B. Bulletins and Pamphlets
   The following may be obtained from the University of Wisconsin - Extension.
   1. AB106G, "Our Productive Land"
   2. A2100, "Sampling Soils for Testing"
   3. A1513, "Soil Productivity Score Card' (C 543)
   4. A1902, "The Soil Survey"
   5. A1222, "We Can All Help Save Our Soil" (C 360)

C. Films
   The following films are available from BAVI — University of Wisconsin.
   1. "Life in a Cubic Foot of Soil," 5677
   2. "Microscopic Life in Soil," 6799
   3. "Raindrops and Soil Erosion," 1812
   4. "Soil Test," 3552
   5. "Understanding Our Earth: Soil," 2875
   6. "Water Movement in Soils," 3660
   7. "What's Happening to Our Landscape?" 6366

D. Laboratory Manuals
   1. *Crop and Soil Science Student Study Manual.* Sheldon Book Company. Sheldon, Wisconsin.
   2. *Vocational Agriculture Soil Management Manual.* Sheldon Book Company.

SOYBEANS

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the soybean industry and will be able to relate these factors to his/her own specific needs and aspirations.

B. Identify and label the parts of the soybean plant.

C. Explain the function of each part of the soybean plant.

D. Explain the pollination and fertilization process of the soybean.

E. List the primary nutrients and trace elements needed by the soybean plant and describe the function of each.

F. Describe the changes that take place during each stage of growth.

G. List and explain the various uses of the soybean plant.

H. Compare various insecticides and herbicides recommended for soybean production.

I. Contrast the methods of applying chemcals for weed control.
J. Compare the methods of soil preparation for soybean production.
K. Describe the farm implements used for producing soybeans.
L. Establish realistic standards and goals for the following efficiency factors: cost of producing a bushel of soybeans, machinery cost per acre, labor and management wage per acre, yield — bushels per acre, seeding rate, plant population, fertilizer rate, and harvesting loss.
M. Explain correct inoculation procedures and reasons for inoculation.
N. Discuss the factors restricting soybean yields; for each restricting factor be able to explain one innovative practice which holds promise or has been proven as a successful, cultural practice.
O. Choose recommended varieties for his/her area.
P. Select the correct seeding methods.
Q. Determine when to harvest soybeans and choose the best method for the drying process.
R. Contrast the various methods of soybean marketing.

II. Concepts to Develop

A. There are career opportunities in the soybean industry for young men and women at all levels of educational preparation.
B. Soybeans are grown for forage, seed and for use as a vegetable.
C. The soybean plant may be used for pasture, hay, silage or as a green manure crop.
D. The seed is used extensively as a feed for livestock and human food.
E. Soil and climate requirements are similar to those of corn.
F. Soybeans do not readily adapt to changes in soil and climate.
G. Good seedbed preparation is essential for high yields.
H. A high level of soil fertility is required for maximum yields.
I. Soybeans should not be planted until the soil temperature is at least 65° F.
J. Seed inoculation is a recommended practice.
K. The method of planting is dependent on the fertility of the soil, moisture conditions, the variety used and the purpose for which the crop is grown.
L. Soybeans should be planted as shallow as possible to insure quick germination and emergence.
M. Several chemicals may be used for effective weed control.
N. Unless diseases are effectively controlled, yields are substantially lowered.
O. Severe losses are the result when insects are not controlled.
P. Care must be exercised during harvesting to minimize losses.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job descriptions.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.
B. Importance of soybeans
   1. Local.
   2. State.
   3. World.
   4. General uses of the soybean.
C. Seed selection
   1. Determine growing season and climatic conditions.
   2. Identify recommended varieties for your conditions.
D. Soybean growth
   1. Parts of the soybean plant and their functions.
   2. Review of plant growth.
   3. Nutrient requirements.
   4. Inoculation.
E. Production techniques
   1. Soil type.
   2. Seedbed preparation.
   3. Implements used in producing soybeans.
   4. Seeding rate.
   5. Planting and cultivation procedures.
   6. Fertilization of soybeans.
   7. Herbicides and common weed identification.
   8. Insecticides and common insect identification.
   9. Harvesting and drying soybeans.
F. Soybean management
   1. Machinery costs.
   2. Labor requirements.
   3. Plant population.
   4. Yields.
   5. Harvesting losses.
   6. Overall cost of producing a bushel of soybeans.
   7. Factors restricting soybean yields.
   8. Innovative practices in soybean production.
G. Marketing soybeans
   1. Storage of soybeans.
   2. Hedging and futures' marketing.
   3. Quality factors.

IV. **Motivation**
- A. Films, filmstrips and slides.
- B. Charts and posters.
- C. Bulletin board displays.
- D. Field trips to successful growers.

V. **Learning Activities**
- A. Occupational experience programs including all phases of production.
- B. Study characteristics of different varieties.
- C. Prepare mounts of plants and seeds.
- D. Collect and prepare mounts of diseased plants.
- E. Collect and prepare mounts of insects which attack soybeans.
- F. Study markets and prepare a graph of cash and futures' prices.
- G. Perform germination tests.

VI. **Materials Needed**
- A. Books
  1. Bear, et al. *Hunger Signs in Crops.* American Society of Agronomy, Washington, D. C. 1949.
  2. Brickbauer & Mortenson. *Approved Practices in Crop Production.* Interstate. 1967.
  3. Delorit & Ahlgren. *Crop Production.* 4th ed. Prentice-Hall, 1973.
  4. Hughes, et al. *Crop Production.* MacMillan Company. 1957.
  5. Wilson. *Producing Farm Crops.* National Farm Book Co. 1960.
- B. Pamphlets
  1. A1684, "Pest Control in Corn and Soybeans," Univ. of Wisconsin-Extension
  2. NCXT27, "Soybeans — Markets and Alternatives," Univ. of Wisconsin - Extension
- C. Films
  1. "The Soybean Story." BAVI 2068.
- D. Publications
  1. *Soybean News*
  2. *Soybean Digest*
  3. *Crops and Soils*
  4. *Weeds*
  5. *Farm Technology*

STRUCTURES, AGRICULTURAL

I. **Performance Objectives**

Upon completion of this unit the student will be able to:
- A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the field of agricultural structures and materials handling and will be able to relate these factors to his/her own specific needs and aspirations.
- B. Explain the principles of organizing farmstead building arrangements and be able to apply these principles to an actual farm situation.
- C. Identify the different types of construction common to various farm housing needs.
- D. Identify and compare types of feed, grain, roughage, waste disposal and milk handling equipment.
- E. With the aid of essential resource data, identify the space requirements for farm livestock, crop and machinery storage.
- F. Determine the utility needs for the various types of farm construction.
- G. With assistance of current construction prices, estimate costs for building farm livestock, crop and machinery, housing, including installation of materials, and handling equipment.

II. **Concepts to Develop**
- A. There are career opportunities in agricultural structures and materials handling for young men and women at all levels of educational preparation.
- B. Proper farmstead arrangement improves the efficiency and use of farm buildings and equipment.
- C. The utility, life and maintenance of a structure is influenced by its type of construction.
- D. Structure, size and shape may vary depending on the type of livestock, crops, and machinery housed.
- E. The health and comfort of livestock, quality of products, efficiency, sanitation, convenience and safety in buildings are dependent on well-planned use of available farm utilities.
- F. Construction, maintenance and operational costs vary widely and change rapidly.

III. **Subject Matter to Teach**
- A. Careers
  1. Current and future employment needs
  2. Job descriptions.
  3. Training requirements.
  4. Working conditions.
  5. Opportunity for advancement.
  6. Other factors relating to student needs and aspirations.

B. Farmstead building arrangements
   1. Factors affecting placement of various buildings.
   2. Rearranging buildings for efficiency.
C. Types of building construction
   1. Building materials.
   2. Building design.
   3. Trends in construction.
D. Systems of handling farm products
   1. Feed — Grain — Roughage distribution and drying.
   2. Waste disposal.
   3. Milking systems.
E. Space requirements.
   1. Housing needs of various livestock, crops and machinery.
F. Utility needs
   1. Electrical requirements.
   2. Ventilation needs.
   3. Heating needs.
   4. Plumbing.
G. Cost analysis
   1. Construction costs.
   2. Equipment costs.

IV. Motivation

A. Sketch a revision of the home farmstead.
B. Field trips to view types of construction and handling systems.
C. Filmstrips, films and slides.
D. Resource persons visit classes and discuss materials handling equipment and types of contruction.

V. Learning Activities

A. Occupational experience programs.
B. Sketch a model farmstead.
C. Perform wiring and plumbing exercises.
D. Design and construct scale models of various farm building components.
E. Perform cost analysis of farm building waste handling systems.
F. Solve actual production problems.

VI. Materials Needed

A. Books
   1. Ashby, Dodge, and Shedd. *Modern Farm Buildings.* Prentice-Hall.
   2. Durbahn & Sundberg. *Fundamentals of Carpentry.* American Technical Society.
   3. Juergenson. *Handbook of Livestock Equipment.* Interstate.
   4. *Cement and Concrete Reference Book.* 33 West Grand Avenue, Chicago, Illinois 60610. Portland Cement Association.
   5. *Concrete Block Construction for Home and Farm.* Valzell and Townsend, American Technical Society. Chicago, Illinois.
   6. *Concrete Technology — Instructors Guide.* Portland Cement Association.
   7. *Electric Control and Basic Control Circuits Used in Agricultural Production.* Vocational Agricultural Education Division, Texas Agricultural Education Division, Texas Education Agency, Austin, Texas.
   8. *Electrical Controls and Basic Control Circuits Used in Agriculture Production. Instructors Guide.* 1967 Engineering Extension Service, Texas A & M University, F. E. Drawer K, College Station, Texas 77843.
   9. *Farm Builders Handbook.* Lytle and Structorer Publishing Co. 3280 Grand River Avenue, Farmington, Michigan 48024.
   10. *Farm Electrification Lesson Plans Wiring and Safety.* Vocational Agricultural Education Division, Texas Agricultural Education Division, Texas Education Agency, Austin, Texas.
   11. *Farm Utility Buildings.* AAVIM.
   12. *Farmstead Wiring Handbook.* Industry Committee on Interior State Wiring Design, Edison Electrical Institute, 750 Third Ave, New York, New York 10017.
   13. *Maintaining the Lighting and Wiring System.* AAVIM.
   14. *Midwest Farm Planning Manual.* Iowa State University Press.
   15. *Planning a Farm Shop Layout.* AAVIM.
   16. *Planning an Individual Water System.* AAVIM.
   17. *Planning Machinery Protection.* AAVIM.
   18. *Understanding Electricity and Electrical Terms.* AAVIM.
   19. *Using Electricity on the Farm.* Prentice-Hall, Inc.
   20. *Wiring Simplified.* Interstate.

B. Bulletins and Pamphlets
   1. "Cooperative Farm Building Plan Exchange Series."*
   2. "Farm Silos." 1967 USDA, Agriculture Research Service.*
   3. "Fire Resistant Construction — of Home — of Farm Buildings." 1967 (Timmins, Merrill).*
   4. "Foundations For Farm Buildings." 1970 USDA Farmers Bulletin No. 1869.*
   5. "Hog-Lot Equipment." 1967 (Zeller, Bond, Petersen).*

* Available from: Superintendent of Documents, U. S. Government Printing Office, Washington, D.C. 20402.

6. "Houses and Equipment for Laying Hens." For Loose Housing. 1967 (OTA, Hajime).*
7. "Making Basements Dry." 1970 (Rule).*
8. "Roofing Farm Buildings." 1969 (USDA Farmers Bulletin No. 2170).*
9. "Silos, Silage, Handling Practices, and Minor Feed Products." 1968 (USDA, Economic Research Service).*
10. "Simple Plumbing Repairs For the Home and Farmstead." 1970 (USDA Farmers Bulletin No. 2202).*
11. "Use of Concrete on the Farm." 1970 (USDA Farmers Bulletin No. 2203).

C. Filmstrips, Slides and Transparencies

Filmstrips

1. "How to Make Galvanized Roofs Last Longer," American Zinc Institute, 324 Ferry Street, LaFayette, Ind.
2. "Metallic Zinc Paint for Metal Surface," American Zinc Institute.
3. "Planning A Farm Shop Layout," AAVIM.

Slides

4. "Concrete Masonry," Vocational Agriculture Service, University of Illinois.
5. "Laying Concrete Masonry Units," Slidefilm No. 434 — Vocational Agriculture Service, University of Illinois, 434 Mumford Hall, Urbana, Illinois.
6. "Planning and Preparing for Concrete Masonry Construction," Slidefilm 433. Vocational Agriculture Service. University of Illinois.
7. "Planning an Individual Water System," AAVIM.
8. "Special Concrete Masonry Problems," Slidefilm 435. Vocational Agriculture Service. University of Illinois.
9. "Understanding Electricity and Electrical Terms," AAVIM.

Transparencies

10. Farm Wiring and Safety — Vocational Instructional Services, Texas A & M University, College Station, Texas 77843.
11. Maintaining the Lighting and Wiring System — AAVIM.

D. Student Workbooks and Lab Manuals

1. *Agri-Business Construction.* Student Guide. 1970. Supervisor Vocational Agriculture, Subject Matter Specialist, 101 Petrie Hall, Auburn, Alabama 36830.
2. *Agri-Business Electricity.* Student Guide. 1970 Supervisor Vocational Agriculture, Subject Matter Specialist.
3. *Agri-Business Masonry.* Student Guide. 1970 Supervisor Vocational Agriculture, Subject Matter Specialist.
4. *Agri-business Woodworking.* Student Guide. 1970 Supervisor Vocational Agriculture, Subject Matter Specialist.
5. *Farmstead Planning Dairy Manual* - Wisconsin Bridge and Iron Company, 5023 N. 35th Street, Milwaukee, WI.

SWINE PRODUCTION

I. **Performance Objectives**

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in swine production and will be able to relate these factors to his/her own specific needs and aspirations.

B. Summarize the history of the swine industry.

C. List current breeds of swine and their contribution to the industry.

D. Compare the management inputs of the different systems of swine production.

E. Select breeding stock based on type, performance records and pedigrees.

F. Develop a breeding stock management plan.

G. Compare nutritional requirements of the various stages of swine growth in the three general areas: birth to weaning, weaning to 125 lb. and 125 lb. to maturity.

H. Discuss swine facilities and equipment needed for the different phases of swine production.

I. Be familiar with the health and sanitation problems of swine raising.

J. Know the offices to contact to keep abreast of state and federal rules and regulations affecting the swine industry.

K. Know the market grades of swine.

L. List and compare the methods of marketing swine for the different systems of production.

M. Be familiar with fitting and showing swine.

II. **Concepts to Develop**

A. There are career opportunities in the swine industry for young men and women at all levels of preparation.

B. A knowledge of the history of the swine industry and the characteristics of the current breeds of swine is helpful in understanding contemporary trends in production.

C. Systems of swine production consist of feeder pig production, farrow to finish, finishing and breeding stock.

D. Management of breeding stock begins with selection and continues through before and during breeding, gestation, farrowing, lactation and A. I.

E. Management of growing swine consists of the stages; birth to weaning, weaning to 125 lbs. and 125 lbs. to maturity.

F. Swine facilities and their management will vary according to the system of operation, geographic and climatic conditions and personal preference.

G. A sound health and sanitation program, consistent with state and federal regulations, is necessary in order to capitalize on sound management in all other aspects of the swine production.

H. Marketing the end product is the final step in the swine production program.

I. Fitting and showing of swine allow the student to demonstrate selection and management skills in class and at home.

III. **Subject Matter to Teach**

A. Careers
1. Current employment information.
2. Job descriptions.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relative to potential employment.

B. Development of the swine industry
1. Early development to the present.
2. Breeds.

C. Systems of swine production
1. Feeder pig production.
2. Farrow to finish.
3. Finishing of purchased feeder pigs.
4. Breeding stock production.

D. Breeding stock management
1. Selection.
2. Before and after breeding.
3. Gestation.
4. Farrowing.
5. Lactation.
6. Artificial insemination.
7. Crossbreeding

E. Swine facilities and their utilization
1. Breeding stock.
2. Farrowing.
3. Post-weaning.
4. Finishing.

F. Health and sanitation
1. Disease and parasite control on the farm.
2. State and federal rules and regulations.

H. Marketing
1. Methods of marketing.
2. Market grades of swine.
3. Breeding stock.

IV. **Motivation**

A. Field trips for selection of breeding stock and market hogs.

B. Field trips to study buildings, equipment and other facilities.

C. Up-to-date instructional media on swine production.

D. Bulletin board displays.

E. Field trips to agribusinesses associated with the swine industry.

V. **Learning Activities**

A. Occupational experience programs.

B. Judging classes of breeding stock and market hogs.

C. Fitting and showing swine.

D. Interpretation of performance data.

VI. **Materials Needed**

A. Books
1. Bundy & Diggins. *Swine Production.* Prentice-Hall, 1970.
2. Ensminger. *Swine Science.* Interstate. 1970.
3. Juergenson & Baker. *Approved Practices in Swine Production.* Interstate. 1971.

B. Pamphlets
1. "Swine Producers Management Handbook," University of Wisconsin - Extension.

C. Periodicals
1. *Hog Farm Manager*
2. *National Hog Farmer*
3. *Nickles for Profit — Wisconsin Pork Producers*
4. *Drovers Journal*

D. Films, Filmstrips and Slides
1. "The Biotin Story," Farm Film Foundation.
2. "Modern Trends in Swine Production," U.S. Steel Corporation, 208 S. LaSalle Street, Chicago, Illinois 60690.
3. "Opportunities on the Hoof," Farm Film Foundation.
4. "Profitable Pork Selection," Farm Film Foundation.

TOBACCO PRODUCTION

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the tobacco industry and will be able to relate these factors to his/her own specific needs and aspirations.

B. Explain the cultural practices necessary for a successful crop.

C. Discuss the labor, machinery and building demands of the tobacco crop.

D. Select marketing procedures which maximize profits.

E. Categorize the uses of tobacco in both foreign and domestic channels.

II. Concepts to Develop

A. There are career opportunities in tobacco production and in the tobacco industry for young men and women at all levels of educational preparation.

B. Profitable tobacco production requires a specific type of soil and climate.

C. Tobacco harvesting utilizes several essential skills and procedures that assure a quality product.

D. Good cultural practices are essential for a successful crop.

E. The development of marketing skills has a positive effect on the income derived from the enterprise.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job descriptions.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Introduction
   1. Efficiency factors in tobacco production.
   2. Climate and soil type requirements.
   3. Labor, machinery and buildings required to grow the crop.
   4. Cost-profit in tobacco production.
   5. Fitting the tobacco enterprise into a program of dairy farming.

C. Choosing a variety of tobacco

D. Starting plants in a hot bed
   1. Building the hot bed.
   2. Soil preparation in the hot bed.
   3. Chemicals for weeds and disease control in the seed bed.
   4. Seeding the bed — time and rate.
   5. Watering, temperature control, control of insects and disease.
   6. Fertilizing plants in the seed bed.

E. Cultural practices in the tobacco field
   1. Crop rotation.
   2. Tillage practices of the soil.
   3. Fertilizing and manuring the tobacco crop.
   4. Liming.
   5. Transplanting from bed to the field — rate — time — and method used.

F. Controlling insects, weeds, and diseases in the field.

G. Harvesting
   1. Topping.
   2. Suckering.
   3. Cutting.
   4. Piling.
   5. Spearing.
   6. Hanging in the shed.
   7. Curing.
   8. Stripping.
   9. Baling.

H. Marketing
   1. Where to market.
   2. When to market.
   3. Uses of tobacco.
   4. Development of domestic and foreign markets.

IV. Motivation

A. Field trip to tobacco warehouse.

B. Tobacco marketing specialist to speak to vo-ag classes.

C. Have students attend tobacco exposition.

V. Learning Activities

A. Occupational experience program.

B. Follow tobacco through marketing channels.

C. Study grading, pricing, and marketing reports.

VI. Materials Needed

1. Brickbauer & Mortenson. *Approved Practices in Crop Production.* Interstate. 1967.
2. Hughes & Hanson. *Crop Production.* The MacMillan Co. 1957.

A. Bulletins and Pamphlets
   1. "Managing Wisconsin Tobacco Seedbed." Circular 441 — University of Wisconsin (Ogden and Newman) - Extension.
   2. "Tobacco Curing." Circular 481 — University of Wisconsin (Ogden) - Extension.
   3. "Tobacco Seedbed Hints." Circular 44 — University of Wisconsin - Extension. (Ogden and Newman)
   4. "Tobacco Seedbed Management." January 1959. University of Wisconsin - Extension. (Everson)

TRACTORS, AGRICULTURAL POWER

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the agricultural power industry and will be able to relate these factors to his/her own specific needs and aspirations.

B. Understand the principles of gasoline and diesel engines.

C. Distinguish the parts of the tractor and discuss their functions.

D. Use the operator's manual effectively in locating information.

E. Be able to perform preventative maintenance and minor repairs on tractors conducting service procedures on fuel systems, carburetors, air cleaner assemblies, crank case lubricant, hydraulic and transmission fluids, cooling systems, batteries, ignition systems, electrical systems, hydraulic systems and brakes.

F. Satisfactorily complete a safe tractor operator examination.

II. Concepts to Develop

A. There are career opportunities in agricultural power for young men and women at all levels of educational preparation.

B. Engines function by following basic principles.

C. Preventative maintenance on tractors is an essential procedure.

D. All tractor operations have a recommended system of servicing.

E. Safety is a learned attitude.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job descriptions.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.

B. Principles of gasoline engines
   1. 4-stroke cycle.
   2. Engine components.

C. Principals of diesel engines
   1. 2-stroke cycle.
   2. 4-stroke cycle.

D. Significance of proper operation and daily care
   1. Tractor replacement costs.
   2. Repair costs.

E. Hydraulic system service
   1. Hydraulic oils.
   2. Principles of hydraulics.
   3. Oil level maintenance.

F. Transmission — final drive system service
   1. Importance of proper service.
   2. Service procedures.

G. Breather systems
   1. Importance of service.
   2. Types of breather systems.
   3. Breather system service.

H. Tires
   1. Tire terminology.
   2. Importance of tire maintenance.
   3. Tire service.

I. Ignition system service.
   1. Plug service.
   2. Distributor service.
   3. Ignition system tune-up procedures and equipment.

J. Electrical system service
   1. Lighting systems.
   2. Accessory systems.

K. Fuel system service
   1. Sediment bowls and fuel filters.
   2. Carburetor principles.
   3. Carburetor adjustment-service.
   4. Diesel fuel filter systems and service.

L. Operators manual
   1. Importance of following manufacturer's recommendations.

M. Crankcase oil service
   1. Crankcase oils.
   2. Importance of regular changes.
   3. Oil change procedures.
   4. Oil filters.

N. Air cleaner assembly service
   1. Types of air cleaners.
   2. Service procedures.
   3. Importance of air cleaner service.

O. Service records and systems
   1. Importance of service.
   2. Service interval jobs.

P. Battery service
   1. Electrolyte levels.
   2. Cleaning.
   3. Safety in servicing batteries.
   4. Battery charging procedures.

Q. V belts
   1. Belt condition and tension.

R. Clutch service
   1. Principles of operation.
   2. Lubrication.
   3. Adjustment.

S. Brake service
   1. Types of brakes and operation.
   2. Brake adjustment.

T. Starters
   1. Functions and principles of operation.
   2. Starter motor service.

U. Charging systems
   1. Charging system principles.
   2. Generator systems.
   3. Alternator systems.
   4. Service procedures.

V. Wheel bearings
   1. Importance of service.
   2. Service procedures.

W. Cooling systems
   1. Cooling system operation and importance of maintenance.
   2. Cooling system problems.
   3. Cooling system service.

X. Preparing tractors for storage.
   1. Recommended storage procedures.

Y. Valve service
   1. Cylinder head torque.
   2. Valve adjustment procedures.

Z. Governors
   1. Principles of operation.
   2. Service procedures.

AA. Tractor cleaning procedures
   1. Steam.
   2. Degreasers.
   3. Importance of regular tractor cleaning.

BB. Selecting tractors
   1. Power requirements.
   2. Costs.
   3. Options.
   4. Tractor test analysis.
   5. Adaptability.

CC. Tractor gauges
   1. Interpretations.

DD. Tractor adjustments
   1. Seats.
   2. Wheels.
   3. Weights.

EE. Safe tractor operation
   1. Pre-starting procedures.
   2. Starting procedures.
   3. Tractor operation in the field.
   4. Hitching-unhitching.
   5. Safe highway operation.
   6. Refueling tractors.
   7. Safe tractor operators' contests.

IV. Motivation

A. Field trip to implement dealer.
B. Slides, filmstrips, transparencies on farm tractors.
C. Student's tractors worked on in the laboratory.
D. Tractor troubleshooting contest.
E. Safe tractor operator program.
F. Bulletin board displays.

V. Learning Activities

A. Occupational experience programs.
B. Perform tractor servicing jobs.
C. Tractor troubleshooting procedures.
D. Safe tractor driving program.

A. Books
   1. Brown & Morrison. *Farm Tractor Maintenance.* Interstate.
   2. Coyes. *Agricultural Mechanics — A Course of Study.* Vocational Education Productions.
   3. Hunt. *Farm Power & Machinery Management.* Iowa State University Press.
   4. Promersberger & Bishop. *Modern Farm Power.* Prentice-Hall.
   5. *Farm Tractors — Basic Principles, Operation & Maintenance,* Engineering Bulletin, FT 53. American Oil Co., 910 South Michigan Ave. Chicago, Illinois 60680.
   6. *Farm Tractor Tune-Up & Service Specifications.* AAVIM. 1972.
   7. Fundamentals of Service Series — *Electrical Systems, Engines,- Hydraulics, Power Trains, Shop Tools, Tires and Tracks.* John Deere. Moline, Illinois. (Transparencies and slides available.)
   8. *Tractor Hydraulics.* AAVIM.
   9. *Tractor Maintenance, Principles and Procedures.* AAVIM.

10. *Tractor Operation and Daily Care.* AAVIM.
11. *Tractor Transmissions.* AAVIM.
12. *Understanding and Measuring Horsepower.* AAVIM.

B. Bulletins and Pamphlets
1. "Costs of Farm Machinery." University of Wisconsin - Extension.
2. "Implement & Tractor." Interstate Publishing Corp.

C. Filmstrips, Slides and Transparencies

Filmstrips
1. "Clutches." International Harvestor.
2. "Fundamentals of Electricity." International Harvestor.
3. "Play It Safe." Ford Tractor Operations.

Slides
1. "Applied Hydraulics." Visual Educaton, Inc.
2. "Basic Hydraulics." Visual Education, Inc.
3. "Electric Motors, Selection, Protection, Drives." AAVIM.
4. "Fundamentals of Machine Operation." Preventive Maintenance. (Transparencies and slides.) John Deere Co., Moline, Illinois. 61265.
5. "Fundamentals of Service: Bearings & Seals, Tires & Tracks, Fuels, Lubricants, & Coolants." John Deere Co.

Transparencies
1. International Harvestor Farm Equipment Safety Teaching Kit.
2. Farm Machinery Operation. Vo-Ag Visuals. University of Illinois.
3. Maintaining the Lighting and Wiring System. AAVIM.
4. Operating Farm Tractors and Farm Machinery. Vo-Ag Visuals.
5. Tractor Fuels and Lubricants. (Transparencies and slides.) AAVIM.

D. Study Guides
1. *Farm Field Machinery* — Marshall Finner — University of Wisconsin, American Printing and Publishing Co. 2909 Syene Road, Madison, WI 53713.
2. *Individual Study Guide on Carburetion.* AAVIM.
3. *Individual Study Guide on Electrical Systems for Spark Ignition Engines.* AAVIM.

E. Laboratory Manuals
1. *Farm Tractor Tune-up and Service Guide.* AAVIM.
2. *I & T Shop Service Manuals.* Interstate.

VEGETABLE CROPS

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the commercial production of vegetable crops and will be able to relate these factors to his/her own specific needs and aspirations.

B. Locate the significant vegetable crop producing regions of the United States and Wisconsin.

C. Relate the importance of the canning industry in Wisconsin in terms of dollar volume and production levels expressed as gross data and as a per cent of the national output.

D. Group the opportunities in the canning industry according to production phase, competency level, and degree of training and work experience required.

E. Provide a written description of the physio-chemical requirements of the most desirable soil for each given list of vegetables.

F. List and discuss the typical kinds of soil erosion, the factors influencing it, and the methods of control.

G. Differentiate among the kinds of soil moisture and be able to describe how it is lost from the soil.

H. Determine the amount of moisture in a sample of soil.

I. Collect representative soil samples under actual field conditions, submit these to a laboratory for analysis, interpret the analysis and write out the appropriate soil management practices.

J. List the three basic fertilizing elements, common sources of each, and describe how they are formulated and applied.

K. List and discuss the three essential phases of plant growth and development.

L. Distinguish between monocotyledonous and dicotyledonous vegetable crop seeds

and identify their parts, and explain the functions of each.

M. Discuss the four basic conditions necessary for seed germination.

N. Describe each of the seven basic plant processes.

O. Identify the type of flower, the parts of the flower, and discuss the functions of each part in the reproductive process.

P. Develop a written plan for seedbed preparation, planting, and cultivation of selected vegetable crops.

Q. Classify weeds according to type, identify them by name, and develop a written program for their control.

R. Classify and identify insects (common to vegetable crops) and develop a written program for their control.

S. List the diseases common to particular vegetable crops and discuss the methods for their control.

T. Describe the conditions that determine the time of harvest, the methods of harvest, and the precautions to observe in preventing injury to specific vegetable crops.

II. Concepts to Develop

A. There are career opportunities in the production of vegetable crops for young men and women at all levels of educational preparation.

B. The vegetable industry contributes significantly to the state and national economy.

C. Vegetable production is concentrated in the lake and coastal states.

D. The increasing volume of food production has direct implications on the labor force.

E. The selection of soil type and appropriate management and cultural practices will vary with the individual vegetable crop.

F. The growth and development of plants consists primarily of cell development, enlargement, and maturation.

G. All seeds may be classified as monocotyledonous or dicotyledonous, each having distinctive seed parts, but the germination and plant processes of all are influenced by common conditions.

H. The cultural practices for different vegetable crops will vary in different sections of the country according to climate, soil, type, availability of labor, and other factors.

I. The identification of weeds is basic to selecting the appropriate method of their control.

J. The fundamental principles of insect and disease control are exclusion, eradication, protection, and immunization.

K. Time and method of harvest will vary according to type of vegetable crop and availability of labor.

L. The principles of vegetable production are applied in Wisconsin to the commercial production of peas, sweet corn, snap beans, cucumbers, beets, lima beans, and cabbage.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job descriptions.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student need's and aspirations.

B. Occupations
   1. Production.
   2. Processing.
   3. Engineering.

C. Scope and economic importance
   1. National.
   2. State.
   3. Vegetable crop statistics.

D. Choosing a soil
   1. Physical requirements.
   2. Chemical requirements.

E. Conserving soil and moisture
   1. Kinds of erosion
      a. Water.
      b. Wind.
   2. Factors influencing soil erosion
      a. Nature of soil.
      b. Climate.
      c. Vegetative cover.
      d. Slope.
   3. Erosion control methods
      a. Management practices.
         1) Use of land.
         2) Water disposal systems.
         3) Cover crop.
         4) Fertilizer and lime used.
         5) Gully control.
      b. Mechanical practices.
         1) Terracing.
         2) Strip cropping.
         3) Crop rotation.
         4) Water outlets.
         5) Diversion.
         6) Raw direction.
   4. Kinds of losses of soil water
      a. Kinds of soil water.
         1) Capillary.
         2) Hydroscopic.
         3) Gravitational.

b. Estimating soil water.

c. Ways soils lose water.
   1) Run off.
   2) Evaporation.
   3) Transpiration.
   4) Percolation.

d. Soil sampling and testing.
   1) Proper time to take samples.
   2) Procedure in taking samples.
   3) Information sheet.
   4) pH test.
   5) NPK tests.
   6) Organic matter level.
   7) Minor elements.

e. Using commercial fertilizer.
   1) Analysis formula and ratios.
   2) Fertilizer requirements for vegetable crops.
   3) Application of fertilizer.
      a) Purposes.
      b) Common types of fertilizers used.
         1. Commercial fertilizer.
         2. Crop residue and manures.
      c) When to apply.
      d) Methods.
         1. Broadcasting.
         2. Drilled-in.
         3. Plow down.
         4. Foliar.

F. Plant structure — function of plant parts
   1. Comparing plants and animals.
   2. Plant cell.
   3. Roots.
   4. Stems.
   5. Leaf.

G. Seed germination
   1. Functions of the seed.
   2. Comparing dicotyledonous and monocotyledonous seeds.
   3. Condition necessary for germination.
      a. Moisture.
      b. Temperature.
      c. Oxygen.
   4. Conditions that affect germination.
   5. Seed dormancy.

H. Plant processes
   1. Photosynthesis.
   2. Absorption.
      a. Diffusion.
      b. Osmosis.
   3. Distribution.
   4. Respiration.
   5. Transpiration.
   6. Use of plant foods.
   7. Storage of plant foods.
      a. Annuals.
      b. Biennials.
      c. Perennials.

I. Plant propagation and improvement
   1. Sexual reproduction.
      a. Floral parts and functions.
      b. Types of flowers.
      c. Pollination.
      d. Fertilization.
   2. Genetic Improvement
      a. Cells, chromosomes, and genes.
      b. Segregation and recombination.
      c. Variations.
      d. Methods of improvement.

J. Disposing of crop residue
   1. Advantages.
   2. Stubble mulching.
   3. Organic matter and humus.
   4. Methods and machinery used.
   5. Results.

K. Land preparations
   1. Tillage.
   2. Characteristics of good seedbed preparation.
   3. Implements used in seedbed preparation.
      a. Disk harrow.
      b. Plows.

L. Planting
   1. Selecting the seed.
      a. Importance of good seed.
      b. Characteristics of good seed.
      c. Seed testing.
   2. Equipment and methods of planting.
      a. Types of planting equipment.
      b. Methods of planting.
      c. Planting and harvesting dates.

M. Cultivating
   1. Advantages.
   2. Time.
   3. Methods.

N. Irrigation
   1. History.
   2. Methods of irrigation.
      a. Sprinklers.
      b. Gravity.
   3. Sources of water.
   4. Costs.
   5. Critical periods.

O. Weed identification
   1. Annual.
   2. Biennial.
   3. Perennial.

P. Mechanical control methods.

Q. Chemical Control Methods.
   1. Chemical safety.
   2. Chemical laws and regulations.
   3. Chemicals and chemical rates for vegetable crops.

4. Time of application.

R. Controlling insects
   1. Identification and classification of insects.
   2. Insecticides and miticides.
   3. Public Law 518.
   4. Critical periods.
   5. Insect scouting.

S. Controlling diseases
   1. Identification of diseases.
   2. Seed treatments.
   3. Fungicides.
   4. Antibiotics.

T. Safe handling of chemicals
   1. Calibration of equipment.

U. Harvesting of vegetable crops
   1. Methods of harvest.
   2. Time of harvest.
   3. Preventing injury.

IV. Motivation

A. Field trip to local canning factory.
B. Field trip to view the planting and harvesting operation of vegetable crops.
C. Visit field demonstration and experimental plots of vegetables at local canning operation.
D. Bulletin board displays.
E. Films, filmstrips and slides.

V. Learning Activities

A. Occupational experience programs.
B. Collect specimens of various vegetables.
C. Grow vegetables in plots to show mineral deficiencies.
D. Demonstrations showing the conditions necessary for germination.
E. Identify various insects that are common problems in vegetable production.
F. Identify various weeds that are common problems in vegetable production.
G. Develop a written plan for the commercial production of a vegetable including soils for vegetable production, plant growth and development, cultural practices, weed control, insect, disease and pest control, and harvesting.

VI. Materials Needed

A. Books
   1. California State Polytechnic College. *Insects: Identification Manual.* San Luis Obispo 1966.
   2. Jaques. *How To Know The Weeds.* William C. Brown Co. 1959.
   3. Libby. *1971 Insect and Disease Control on Vegetables.* University of Wisconsin - Extension.
   4. McCollum. *Producing Vegetable Crops.* Interstate 1968.
   5. Westcott. *Plant Disease Handbook.* Van Nostrand Co. 1960.

B. Bulletins and Pamphlets
   1. Gritton. "Growing Processing Peas in Wisconsin." College of Agriculture and Life Sciences. University of Wisconsin. 1958.
   2. California State Polytechnic College. "Vegetable Identification." San Luis Obispo, California.
   3. Wisconsin State Employment Service, Occupational Analysis Field Center. "Fruit and Vegetable Processing Jobs." Madison, Wisconsin.
   4. The following are available from the University of Wisconsin - Extension.
      R1618, "Determining Common Rot Potential of Pea Fields."
      A2099, "Growing Snap Beans for Processing: A Guide for Wisconsin Farmers."
      A1487, "Growing Wisconsin Potatoes: Hints for a Successful Crop."
      A2144, "Insecticide Use on Wisconsin Processing Crops, 1969."
      A1691, "Tomatoes in Wisconsin."
      A2093, "Vegetable Insects."
      A1653, "Vegetable Varieties for Wisconsin Gardens."
      A2206, "Wisconsin Processing Crop Statistics."

C. Films
   1. "Adventures in Agriculture — Automated Packing Houses." Package Research Library, 21 Pine Rockaway, New Jersey 07866.
   2. "Cranberries." University of Wisconsin - Extension.
   3. "Fresh From the West." Union Pacific Railroad, Motion Picture Bureau, 1416 Dodge Street, Omaha, Nebraska 68102.
   4. "Head Lettuce in Wisconsin: Promise and Problems of a New Speciality Crop." 5690. BAVI.
   5. "Mulching With Black Polyethylene." 5060. BAVI.
   6. "Pests or Plenty." 1572. BAVI.
   7. "Safe Use of Pesticides." 5688. BAVI.
   8. "Sunny Shores." Mann Packing Company, P.O. Box 908, Salinas, California 93901.
   9. "Vegetable Insect Control." Chevron Chemical Company, Ortho Division, 200 Bush Street, San Francisco, California 94104.
   10. "Vegetable Insects." 2345. BAVI.

WEED IDENTIFICATION AND CONTROL

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in weed control and will be able to relate these factors to his/her own specific needs and aspirations.
B. Develop a list of detrimental effects of weeds on crop production.
C. Describe the aesthetic effects of weeds.
D. Identify weeds common to Wisconsin.
E. Identify weed seeds common to Wisconsin.
F. Define terms used in the classification of weeds.
G. List examples of weeds in the various weed classification categories.
H. Propose various preventative practices of weed control, such as use of clean seed and caution with custom operators.
I. Interpret and apply chemical recommendations for specific weed problems.
J. Recognize when to use mechanical weed control methods.
K. Define terms relating to time of herbicide application.
L. Define terms relating to the type of application.
M. Apply a formula used in calibrating a sprayer.
N. List the proper steps of safe handling of herbicides.
O. Interpret the ingredients found on a chemical label.
P. Interpret and apply noxious weed laws to a local situation.
Q. Perceive possible affects of herbicides on the environment.

II. Concepts to Develop

A. There are career opportunities in weed control for young men and women at all levels of educational preparation.
B. Weed control methods vary in economy and by type.
C. Some types of weeds are termed noxious.
D. Weeds may be classified using one of several systems.
E. Herbicides, a type of chemical control, vary in method of application.
F. All chemicals need safe handling.
G. Some chemicals may have an undesirable effect on the environment.

III. Subject Matter to Teach

A. Careers
   1. Current and future employment needs.
   2. Job descriptions.
   3. Training requirements.
   4. Working conditions.
   5. Opportunity for advancement.
   6. Other factors relating to student needs and aspirations.
B. Economics of weed control
   1. Effect of food supply.
   2. Cost to producer.
   3. Aesthetic values.
C. Weed identification
   1. Plant identification.
   2. Seed identification.
D. Classification of weeds
   1. Annuals, biennials, perennials.
   2. Broadleaf and grasses.
   3. Root systems.
   4. Noxious weeds and special laws.
E. Weed control methods
   1. Preventative practices.
      a. Rotation.
      b. Seed bed.
      c. Prevention from seeding (mowing, etc.).
   2. Chemical
      a. Types.
      b. Time of application.
      c. Type of application.
      d. Equipment.
      e. Calibration of equipment.
   3. Mechanical
      a. Cultivation.
   4. Other
      a. Flame.
      b. Mulch.
      c. Smothering.
F. Environmental effect of herbicides

IV. Motivation

A. Field trips to collect and identify weeds and weed seeds.
B. Slides and filmstrips relating to weeds and weed seeds.
C. Demonstration on the calibration of a sprayer.
D. Guest speaker concerning related careers.
E. Bulletin board display.

V. Learning Activities

A. Weed control measures utilized in occupational experience program.
B. Collect, identify and display weed seeds common to the areas.
C. Calibrate a sprayer.

D. Collect and display labels from herbicide containers.
E. Develop test plots to study the effect of herbicides.

VI. Materials Needed

A. Books
1. *Common Weeds of the U.S.* — U.S. Department of Agriculture.
2. *Handbook on Agricultural Occupations.* Interstate.
3. *Identification and Judging Crops Weeds and Diseases.* Interstate.
4. *Weeds of North Central States.* Circular 718, University of Illinois. Champaign, Illinois.

B. Bulletins and Pamphlets
1. Berge. "Sprayer Calibration Charts." Agricultural Engineering Department. University of Wisconsin.
2. Buchholtz and Doersch. "24 of Our Worst Weeds." University of Wisconsin - Extension.
3. Buchholtz and Peterson. "Weed Control in Field Crops." Cir. 447 University of Wisconsin - Extension.
4. Catalog 35, "Agricultural Spray Nozzles." 3201 Randall St. Bellwood, Illinois. 60104.
5. "Farm Chemical Manual." Standard Oil Division. American Oil Co.
6. "General Farm Use of Pesticides." Wisconsin Statistical Reporting Service, Box 156, Madison, Wisconsin.
7. "Pesticide Lesson Plans for Vocational Agriculture." Geigy Chemicals.
8. "Sprayer and Granular Applicator Calibration." Cir. 540. Univ. of Wisconsin - Extension.
9. "Sprayer Service Letter." University of Wisconsin - Extension.
10. "Your Guide to Identifying Weeds and Grasses" Elanco Products Co. Eli Division of Indianapolis, Indiana.

C. Films, Filmstrips and Slides
1. "A Systematic Approach to Weed Control." NASCO Fort Atkinson, Wisconsin.
2. "Combating Weeds in Temporary Grazing of Small Grain and Hay." NASCO.
3. "Crop Weed Slides, Various Assortment." NASCO.
4. "Identification of Weeds — Part I." NASCO.
5. "Identification of Weeds — Part II." NASCO.
6. "Just Weeds." 3138. BAVI. Univ. of Wisconsin - Madison.
7. "Let's Look at Weeds." 3311. BAVI.
8. "Predict Weed Problems with Weed-Seed Analysis." John Deere Films.

WELDING, ARC

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in the welding industry and will be able to relate these factors to his/her own specific needs and aspirations.
B. Understand safety practices and procedures.
C. Identify different metals and select the correct rod and use techniques to obtain a quality weld.
D. Operate welders with different features and means of adjustment.
E. Comprehend the different ratings used in classifying welders.
F. Select the proper amperage setting when using different diameters of electrodes on varying thicknesses of steel.
G. Contrast A.C. and D.C. welding equipment.
H. Be familiar with the American Welding Society system of classifying electrodes and be able to identify five of the common rods.
I. Comprehend the effect of current settings, length of arc, angle of electrode and speed of travel has on the bead or deposit.
J. Prepare the various thicknesses of carbon steel, and cast iron to secure complete fusion, obtain maximum strength and minimize distortion.
K. Understand the forces of distortion and shrink and employ measures for their control.
L. Weld lap joints, corner joints, butt joints, and edge or flange joints in all positions.
M. Weld "T" joints on the flat or horizontal position.
N. Utilize the carbon arc torch to braze sheet metal, fuse hard facing powder on

plow shares and remove rusty nuts from bolts.

O. Pass a certification test on structural steel.

P. Pass a certification test for welding pipe in any axis.

Q. Perform all welding repair jobs on equipment and machinery on the home farm.

R. Successfully perform assigned tasks in any metal fabricating shop and after two weeks of on-the-job instruction, pass whatever certification test is necessary to comply with the welding code and requirements.

S. Choose the correct electrodes to use in welding ferrous and non ferrous metals.

T. Pierce holes and cut steel plates of varying thicknesses.

U. Understand the advantages and disadvantages of MIG welding.

V. Comprehend the basic principles of operation and their application in MIG welding.

W. Weld lap joints, "T" joints, butt joints, corner joints and edge or flange joints in the flat, horizontal and vertical down position. (MIG WELDING)

X. Understand the basic principles of operation in gas tungsten arc welding.

Y. Comprehend the basic principles of operation and their application in TIG welding.

Z. Choose filler metals to use in welding aluminum, magnesium, stainless steel, copper and copper alloys. (TIG WELDING)

AA. Repair aluminum shovels, elevators, boats and castings of various types. (TIG WELDING)

BB. Repair items manufactured from magnesium including lawn mower decks and ladders. (TIG WELDING)

CC. Weld equipment manufactured from various kinds of stainless steel. (TIG WELDING)

DD. Weld items manufactured from copper and copper alloys. (TIG WELDING)

II. Concepts to Develop

A. There are career opportunities in welding for men and women at various levels of educational preparation.

B. A constant awareness of safety is needed by all persons at all times.

C. Rewards in the welding industry is commensurate with the level of skill obtained and his/her willingness to work.

D. Continual upgrading in knowledge and in skill development may be accomplished by enrolling in evening classes.

E. Attainment of a high level of proficiency contributes significantly to his/her self image.

F. Distortion and shrink can be effectively controlled by a skilled welder.

G. A welder must be certified before being employed on some construction projects.

H. Certain metals and their alloys require a special welding process.

I. Special techniques are utilized when welding various joints in different positions.

J. A person passing a high level of welding skill can command an excellent salary.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job descriptions.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Safety
1. Clothing and shields.
2. Eye protection.
3. Safeguarding others.
4. Keep equipment dry.
5. Do not operate with welder with cables wrapped around the welder.

C. Advantages of arc welding
1. Penetration.
2. Stability of arc.
3. Ease in starting and maintaining the arc.

D. Types of arc welding machines
1. Types of arc welding generator units.
2. Transformer type machines.
3. Dual purpose welders.
4. Metal inert gas.
5. Heli-arc welding.
6. Understanding how arc welders operate.

E. Adjusting and starting the arc welding machine
1. Procedure for adjusting the current.
2. Inspection of electrode holder leads and connections.

F. Preparing the metal
1. Cleanliness.
2. Mounting.
3. Identification.
4. Preparation of metal edges.
5. Support of pieces to be welded.

G. Selecting the electrode
1. Chemical composition of coverings.
2. Composition of electrode metals.
3. Electrode diameters.

4. Color codes and numbers.
5. Variables affecting the choice of electrodes.
6. Economics.

H. Welding procedure
1. Striking the arc.
2. Maintaining the arc.
3. Stopping the weld.
4. Restarting the weld.
5. The forces of distortion and shrink.

I. The carbon arc torch
1. Adjustments.
2. Components.
3. Uses.

J. Identification of iron and steel
1. Spark test.
2. Oxyacetylene torch test.
3. Fracture test.
4. Color tests.
5. Ring or sound test.
6. Magnetic test.
7. Chip test.

K. Identification of nonferrous metals
1. Color.
2. Hardness.

L. Skill development
1. Prepare metal for welding.
2. Weld in the flat and horizontal position — "T" joints, lap joints, corner joints, butt joints, edge or flange joints.
3. Braze sheet metal.
4. Fuse hard facing powder on plow shares and cultivator shovels.
5. Remove a nut from a rusted bolt.
6. Weld structural steel in the vertical up position.
7. Technique of "U" or "J" motions or a stringer bead technique.
8. Fill a one inch "open butt joint."
9. Sixty degree groove joints.
10. Lap or "T" joints using thin metals.
11. Weld structured steel in the overhead position.
12. Evaluation of welds.
13. Pipe welding in the vertical and horizontal axis.
14. Welding aluminum, magnesium, stainless steel, copper and copper alloys.

M. Project activities
1. Repair of equipment.
2. Project construction.
3. Blueprint reading.

IV. Motivation — Beginning Welding

A. Films, slides and filmstrips.
B. Charts.
C. Bulletin board displays.
D. Field trip to a manufacturer of welders.
E. Field trip to construction sites to observe welders on the job.
F. Field trip to industries to view factory type welding jobs.

V. Learning Activities

A. Occupational experience program.
B. Identify beads made with a short arc, long arc, high amperage and low amperage.
C. Run a bead.
D. Weld metals of varying thickness in all positions.
E. Repair machinery and equipment.
F. Identify common metals by means of the spark test.
G. Collect, label and display commor electrodes used in area industries and schools.
H. Remove a nut from a rusted bolt.
I. Construct steel positioning clamps, steel pens, steel saw horses and machinery jacks.
J. Collect, label and display specimens of steel, cast iron, cast steel, stainless steel, aluminum, magnesium, high carbon steel, ductile cast iron, white cast iron, copper brass and bronze, and the electrodes used to weld these metals.
K. Secure price listings to determine what quantities of rods to purchase.
L. Weld in the vertical up position utilizing a weaving or stringer bead technique.
M. Develop the technique of welding a single pass in each quadrant, then two passes over one, then three over two, then four passes over three, then five passes over four.
N. Fill a one inch "open butt joint" eight inches long.
O. Complete a 60 degree groove point exercise.
P. Complete a lap on "T" point on metal 3/16" or less.
Q. Complete horizontal welding exercises.
R. Complete exercises of welding structural steel in the overhead position.
S. Complete pipe welding exercise in the vertical and horizontal axis.
T. Construct projects such as an individual calf stall, trailer hitches, wagons and steel inclines for tractors.
U. Repair broken farm machinery, equipment and build up and hard surface worn machine and equipment parts.

VI. Materials Needed

A. Books
1. *Arc Welding Instructions For the Beginner.* Sosnin. Lincoln Electric Co., Cleveland, Ohio 44117

2. *Arc Welding Lessons For Schools and Farm Shop.* Lincoln Electric Co.
3. *Basic Welding Principles.* Stieri. Prentice-Hall. 1953.
4. *Farm Arc Welding.* Morford. Lincoln Electric Co.
5. *Farm Mechanics Text and Handbook.* Phipps. Interstate. 1959
6. *Metals and How to Weld Them.* Jefferson & Woods. Lincoln Electric Co.
7. *Metals Handbook.* 8th Edition. Volume 6. Welding & Brazing. American Society For Metals, Metals Park, Ohio, 44073. 1971.
8. *Modern Welding. Althouse,* Turnquist & Bowditch. Goodheart Willcox Inc. 1965.
9. *New Lessons in Arc Welding.* Lincoln Electric Co.
10. *The Farm Shop.* Wakeman & McCoy. Macmillian Co. 1960.
11. *The Welding Encyclopedia.* 17th Edition. Jefferson. Monticello Books, Morton Grove, Illinois. (An answer book may be obtained also.)
12. *Welding Handbook:* 6th Edition. American Welding Society, 2501 N. W. 7 St., Miami, Florida 33125.
    Section 1 — Fundamentals of Welding. 1968 and 1974.
    Section 2 — Welding Processes — Gas, Arc, & Resistance. 1969.
    Section 3A — Welding, Cutting & Related Processes. 1970.
    Section 3B — Welding, Cutting & Related Processes. 1971.
    Section 4 — Metals and Their Weldability. 1972.
    Section 5 — Applications of Welding — 1973.

B. Bulletins and Pamphlets
1. "Aids to Excellent Machine Design in Welded Steel." Lincoln Electric Co. Cleveland, Ohio. 44117.
2. "Arc Welding — Basic Manual of Instruction." Lincoln Electric Co.
3. "How to Do TIG Welding." Linde Division, Union Carbide Co., New York, New York. 10017.
4. "How to Do Heliarc Welding of Pipe." Linde Division.
5. "Possibilities in Production Brazing." Handy & Harmon. 850 Third Avenue, New York, New York. 10022.
6. "Principles of Arc Welding." Miller Electric Mfg. Co., Appleton, Wisconsin.
7. "Recommendation for Teaching Welding." Hobart Brothers Technical School. Troy, Ohio 45373.
8. "Recommended Safe Practices in Cutting and Welding." Airco Welding Products, 150 E. 42nd Street, New York, New York.
9. "Short Arc." Linde Division.
10. "Stoody Farm Hardsurfacing Handbook." Stoody Company., Whittier, Cal. 90608.
11. "The Welding & Cutting Manual." Linde Division.

C. Instructon and Study Guides
1. *Arc Welding* - Part 1- Self Instruction Guide. Olson. Vector Publications, 1945 Sharondale Avenue, St. Paul, Minn. 55113.
2. *Arc Welding* - Part 2 - Self Instruction Guide. Olson. Vector Publications.
3. *Arc Welding* - Teacher's Guide - Self Instruction Guide. Vector Publications.
4. *Metals & Welding in Agriculture.* Morford, Hoerner & Anderson. Hobar Publications Publications, 1305 Tiller Lane, St. Paul, Minnesota 55112.
5. *Study Guide, Welding Skills and Practices.* 3rd Edition. Masterton. American Technical Society.

D. Films
The following are available from BAVI, University of Wisconsin - Madison.
1. "Alternating Current, Flat & Horizontal," 9084.
2. "Arc Welding With CO^2," 4366.
3. "Design For Arc Welded Structures," 2666.
4. Fundamentals of Manual Shielded Arc:
   a) "Welding Techniques, Part 1, Flat & Horizontal Position," 5185.
   b) "Welding Techniques, Part II, Vertical & Overhead Position," 5186.
5. "Fusion Welding," 5220.
6. "Magic Wand of Industry," 2718.
7. "Prevention & Control of Distortion in Arc Welding," 2665.

E. Filmstrips
1. "Arc Welding Electrode Selection," Hobard Brothers, 600 W. Main Street, Troy, Ohio. 45373.
2. "Learning Arc Welding Skills." Lincoln Electric Co., Cleveland Ohio 44117.
3. "Welding Comes to the Farm." BAVI. 2401.

WELDING, GAS

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Be familiar with current employment information, such as job descriptions, job availability, personal training requirements, working conditions, opportunity for advancement and other factors relative to potential employment in gas welding and will be able to relate these factors to his/her own specific needs and aspirations.

B. Select welding tips and make necessary regulator adjustments which are appropriate to the problems of repairing farm machines and equipment.

C. Understand the forces of distortions and shrink.

D. Perform all welding repair jobs on farm machinery and equipment.

E. Pass a certification test on structural steel for all welding positions.

F. Pass a certification test in pipe welding in any axis.

G. Perform jobs in any fabricating shop and after two weeks of on-the-job instruction, pass whatever certification test is necessary to comply with the welding code and requirements.

H. Pass a pipe welding test using oxy-acetylene to weld small diameter pipe to meet code requirements.

I. Construct special equipment to meet farm needs, or construction needs in industry.

J. Understand and use safe operating practices and procedures.

K. Secure a neutral, carburizing and oxidizing flame and know under what conditions each is used.

L. Perform fusion welding of mild steel in the flat position and master skills in running a bead, weld a lap joint, a corner joint and an edge or flange joint.

M. Understand the conditions under which brazing is used.

N. Comprehend the principles of brazing.

O. Braze all of the joints listed in L above.

P. Braze a small hole or braze weld a patch on a larger hole.

Q. Perform hard facing jobs to protect equipment from excess wear by abrasion.

R. Discuss joint designs; prepare and weld joints to obtain maximum strength.

S. Select base metals which can be brazed.

T. Use techniques which minimize the forces of stress.

U. Explain the characteristics of brazing filler metals.

V. Understand the purpose and use of brazing flux.

W. Grasp the importance of pre-cleaning and surface preparation.

X. Braze gray cast iron, malleable cast iron, ductile iron, low carbon and low alloy steel, high speed tool steel, stainless steel, nickel and nickel alloys, copper and copper alloys, magnesium and magnesium alloys.

Y. Perform and explain post-braze treatment.

Z. Understand the importance of removing flux.

AA. Properly tin an entire Vee and on multiple passes obtain complete fusion between the new deposit and previously deposited layers of bronze.

BB. Cut metals of various thicknesses with the oxy-acetylene torch.

CC. Define the terms "drag" and "kerf."

DD. Cut a piece of steel one inch thick.

EE. Understand what effect the cutting process has on the hardening of steel.

FF. Recognize and explain the problems associated with the cutting of metals.

GG. Demonstrate ability with the cutting torch to perform an exercise in scarfing, gouging and grooving.

II. Concepts to Develop

A. There are career opportunities in gas welding for young men and women at all levels of educational preparation.

B. A constant awareness of safety is needed by all persons at all times.

C. Rewards in the welding industry are commensurate with the level of skill attained and his/her willingness to work.

D. Continual upgrading in related subject areas and in skill development may be accomplished by enrolling in evening classes or in correspondence courses.

E. The attainment of a high level of proficiency contributes significantly to his/her self image.

F. Distortion and shrink can be effectively controlled by a skilled welder.

G. A welder must be certified before being employed on some construction projects.

H. Certain metals and their alloys require a special welding process.

I. Special techniques are utilized when welding various joints in different positions.

J. A person possessing a high level of welding skill can command an excellent salary.

III. Subject Matter to Teach

A. Careers
1. Current and future employment needs.
2. Job descriptions.
3. Training requirements.
4. Working conditions.
5. Opportunity for advancement.
6. Other factors relating to student needs and aspirations.

B. Safety
1. Clothing and shields.
2. Eye protection.
3. Safeguarding others.
4. Handling fuel and oxygen containers.
5. Remove combustibles from pockets.
6. Materials used for welding supports.
7. Welding or cutting tanks and containers.
8. Checking for leaks.
9. Opening of oxygen valves.
10. Purging oxygen valves, lines and equipment.
11. Support of gas cylinders.
12. Identification of cylinders.
13. Storage of empty and full cylinders.
14. Care of regulators.
15. Do not lay down a lighted torch.
16. Lighting the torch.
17. Blowing out acetylene valves.
18. Attaching regulators to the tanks.
19. Hose fittings.
20. Protection and inspection of hoses.
21. Follow manufacturer's recommendations.

C. Identification of iron and steel
1. Spark test.
2. Oxy-acetylene torch test.
3. Fracture test.
4. Color test.
5. Ring or sound test.
6. Magnetic test.
7. Chip test.

D. Identification of non-ferrous metals
1. Color.
2. Hardness.

E. Properties of the gases
1. Oxygen.
2. Acetylene.
3. Mixture of oxygen and acetylene.

F. Flame adjustment
1. Lighting the torch.
2. Neutral flame.
3. Carburizing flame.
4. Oxidizing flame.
5. Cutting torch adjustment.

G. Tip selection and care
1. Designation of sizes.
2. Procedure for cleaning.
3. Criteria for tip selection.

H. Brazing
1. Principles of brazing.
2. Conditions for use.
3. Preparation and design of joints for maximum strength.
4. Selection of base metals which can be brazed.
5. Use of filler metals, conditions and techniques in their use.
6. Preparation of joints and brazing techniques to use in minimizing stress.
7. Characteristics of brazing filler metals.
8. Purpose and use of brazing fluxes.
9. Purpose and importance of pre-cleaning and surface preparation.
10. Post-braze treatment.
11. The importance of flux removal.

I. Cutting with the oxy-acetylene unit
1. Principles of the cutting preparation.
2. Define the terms "drag" and "kerf".
3. Regulator pressures for cutting steel up to 1" thick.
4. Advantages and disadvantages of acetylene, natural gas and propane.
5. Effect of the cutting process on steel hardening.
6. The effect alloying elements have on the resistance of steel to oxygen cutting.
7. Conditions necessary for heavy cutting.
8. Basic types of cutting torches.

J. Skill development
1. Fusion welding of mild steel in the flat position
   a. Run beads on a ⅛" steel strip.
   b. Weld a lap joint.
   c. Weld a flush corner joint, a half open corner joint, and a full open corner joint.
   d. Weld a butt joint securing complete fusion and penetration.
   e. Weld a "T" joint.

f. Weld an edge or flange joint on light material.

2. Brazing
   a. Use 1/8" strips or sheet metal and braze a lap joint, corner joint, butt joint, "T" joint and an edge or flange joint.
   b. Braze a small hole in a pail.
   c. Braze weld a patch on a larger hole.
   d. Braze other metals and alloys.
      1) Gray cast iron.
      2) Malleable cast iron.
      3) Ductile cast iron.
      4) Low carbon and low alloy steel.
      5) High carbon steel.
      6) High speed tool steel.
      7) Stainless steels.
      8) Nickel and nickel alloys.
      9) Copper and copper alloys.
      10) Aluminum and aluminum alloys.
      11) Magnesium and magnesium alloys.
      12) Proper tinning of the entire vee, and on multiple passes, obtain fusion between the new deposit and previously deposited layers of bronze.

3. Cutting with the oxy-acetylene torch
   a. Cut a steel plate up to one inch thick.
   b. Scarfing.
   c. Gouging.
   d. Grooving.

4. Welding in the vertical up position
   a. Run beads in vertical up position and adding filler rod from the top.
   b. Weld a butt joint.
   c. Weld a lap joint.
   d. Weld a "T" joint.

5. Welding in the horizontal position
   a. Run beads in the horizontal position.
   b. Weld a butt joint.
   c. Weld a lap joint.
   d. Weld a "T" joint.

6. Hard surfacing metals
   a. Plowshares.
   b. Cultivator shovels.
   c. Tractor chains.

K. Project activities
   1. Repair of equipment.
   2. Project construction.
   3. Blueprint reading.

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IV. Motivation

A. Films, filmstrips and slides.
B. Charts.
C. Bulletin board displays.
D. Field trip to welding repair shops.
E. Field trip to construction site to view welders on the job.
F. Field trip to industrial firm to view factory type welding jobs.

V. Learning Activities

A. Occupational experience program.
B. Run beads.
C. Weld metals of varying thicknesses in the flat, horizontal and vertical position.
D. Repair machinery and equipment.
E. Construct projects.
F. Identify common metals.
G. Weld pipe in any axis.
H. Braze a lap joint, a corner joint, a "T" joint and an edge or flange joint.
I. Braze a small hole or braze weld a patch on a larger hole.
J. Apply hard facing metal to various parts of equipment.
K. Complete brazing exercises on gray cast iron, malleable cast iron, ductile cast iron, low carbon and low alloy steel, high speed tool steel, stainless steel, nickel and nickel alloys, copper and copper alloys, magnesium and magnesium alloys.
L. Cut metals with the oxy-acetylene torch.
M. Complete scarfing, gouging and grooving exercises.

VI. Materials Needed

A. Books
   1. *Basic Welding Principles.* Stieri. Prentice-Hall. 1953.
   2. *Farm Mechanics Text and Handbook.* Phipps. Interstate. 1959.
   3. *Metals Handbook.* 8th Edition: Volume 6. Welding & Brazing. American Society for Metals, Metals Park, Ohio. 44073.
   4. *Modern Welding.* Althouse, Turnquist & Bowditch. Goodheart-Willcox Inc. 1965.
   5. *The Farm Shop.* Wakeman & McCoy. MacMillan Co., New York. 1960.
   6. *The Oxy-Acetylene Handbook.* Linde Division. Union Carbide Corp., New York, New York. 10017. 1960.
   7. *The Oxy-Acetylene Welder's Handbook.* Jefferson. Monticello Books, Morton Grove, Illinois.
   8. *The Welding Encyclopedia.* 17th Edition. Jefferson. Monticello Books, (Answer book is also available.)

9. Welding Handbook: 6th Edition. American Welding Society, 2501 N.W. 7 St., Miami, Florida 33125.
Section 1 — Fundamentals of Welding. 1968 and 1974.
Section 2 — Welding Processes — Gas, Arc, & Resistance. 1969.
Section 3A — Welding, Cutting & Related Processes. 1970.
Section 3B — Welding, Cutting, & Related Processes. 1971.
Section 4 — Metals and Their Weldability. 1972.
Section 5 — Applications of Welding — 1973.

B. Bulletins and Pamphlets

1. "Haynes Alloys — Hardfacing Manual." Linde Division. Union Carbide Company. New York, New York. 10017.
2. "How To Do TIG Welding." Linde Division.
3. "How to Repair Broken Cutting Tools With Easy Flo Low Temperature Silver Brazing Alloy." Bulletin No. 14, Harmon & Handy, 850 Third Ave., New York, New York 10022.
4. "Oxy-Acetylene Welding," Hardsurfacing, Lead Burning and Cutting. Potter. National Farm Book Company.
5. "Recommended Safe Practices in Cutting and Welding." Airco Welding Products, 150 E. 42nd Street, New York, New York.
6. "Stoody Farm Hardsurfacing Handbook." Stoody Co., Whittier, Calif. 90608.
7. "Stoody Hardfacing Guide." Stoody Co.
8. "The Welding and Cutting Manual." Linde Division.

C. Films

The following films are available from BAVI — University of Wisconsin - Madison.

1. "Air-Acetylene Flame," 5218.
2. "Fusion Welding," 5220.
3. "The Oxy-Acetylene Flame — Master of Metals," Bureau of Mines — U.S. Dept. of Interior, 4800 Forbes Avenue, Pittsburgh, Penn. 15213.

WISCONSIN JUNIOR DAIRYMEN'S ASSOCIATION

I. Performance Objectives

Upon completion of this unit the student will be able to:

A. Explain the aims and purposes of the Wisconsin Junior Dairymen's Association.
B. Discuss the requirements for membership in the association.
C. Describe activities conducted at the local, district and state level.
D. Be familiar with the constitution and by-laws of the organization.
E. Comprehend the many opportunities for leadership development afforded by the association.
F. Explain dairy record analysis procedures.
G. Analyze the records kept on the home herd or an example set of records developed by the instructor.

II. Concepts to Develop

A. Recognized procedures for animal and record evaluation contribute significantly to the herd building program.
B. The analysis of dairy production records provides useful information for determining which cows should be culled.
C. The dairy industry is supported by several strong organizations.
D. Thousands of young men and women have progressed from their high school DHI programs into successful young farmers.
E. The WJDA has provided a means for high school dairymen and young farmers to gain recognition for their achievement in improving the dairy herds of Wisconsin.
F. The WJDA provides many leadership opportunities for its members.
G. The dairy cow exposition is the only one of its kind in the nation.
H. The WJDA provides numerous opportunities for young men and women to improve their communication skills.

III. Subject Matter to Teach

A. Historical development of the Wisconsin Junior Dairymen's Association.
   1. Early developments of the organization.
   2. Need for an association.
   3. Governing structure.
B. Requirements for membership
   1. Dues.
   2. Involvement in herd testing and analysis of work.
   3. Age.
C. Membership objectives
   1. Specific student interest activities.
   2. Development of skills valuable to a dairyman.
   3. Advancement of the dairy industry.
   4. Leadership development.
   5. Practical knowledge of dairy records.
D. Activities of Wisconsin Junior Dairymen's Association
   1. Local activities.
   2. District activities.
   3. State activities.
E. Awareness of special advantages
   1. Scholarships.
   2. Dairy show premiums and trophies.
   3. Opportunities to meet state dairy leaders.
   4. Unique educational opportunities.

IV. Motivation

A. Display trophies and awards.
B. WJDA officers speak to vocational agriculture classes.
C. Attend district meetings.
D. Attend state WJDA convention.
E. Slides of local and state JDA activities.

V. Learning Activities

1. Complete DHI monthly worksheet.
2. Complete production reports.
3. Participate in milk marketing contest.
4. Deliver an extemporaneous speech.
5. Participate in demonstration contest.
6. Participate in sire selection contest.
7. Participate in the classification contest.
8. Exhibit a cow at the state dairy show.
9. Be a contestant for the Junior Dairyman Award.
10. Serve as an officer of the local or state association.

VI. Materials Needed

A. Books
   1. *Dairy Herd Improvement Handbook*, (revised 1973) National Book Company.
B. Newsletter. Available from Claude Klimpke, WJDA Executive Secretary, Oconto Falls, Wisconsin.
C. Periodicals
   Hoards Dairyman
   Successful Farmer
D. Films and slides
   1. "Dairy Herd Improvement," 4341, BAVI, University of Wisconsin - Madison.
   2. "Electronic D.H.I.A. Records," Available for purchase and in special situations for rental from Dr. Clarence Olson, Dairy Science Department, University of Wisconsin - Madison 53706.

DIRECTORY OF PUBLISHERS

AAVIM
American Association for Vocational Instructional Materials. Engineering Center, Athens, Georgia 30602.

A & L
A & L Publications. Station A, Box F, Champaign, Illinois 61820.

American Forestry
American Forestry Association. 919 17th Street, N. W., Washington, D. C. 20006.

American Oil
American Oil Company. 910 S. Michigan Avenue, Chicago, Illinois 60680.

American Poultry
American Poultry & Hatchery Foundation. 521 East 63rd Street, Kansas City, Missouri 64110.

Arco
Arco Publishing Company. 219 Park Avenue South, New York, New York 10003.

Avi
Avi Publishing Company. Box 831, Westport, Connecticut 06880.

Barnes
A. S. Barnes & Company, Inc. Cranbury, New Jersey 08512.

Brown
William C. Brown Company, Publishers. 135 South Locust Street, Dubuque, Iowa 52001.

Bruce
Bruce Publishing Company. 400 No. Broadway, Milwaukee, Wisconsin 53201.

Caxton
Caxton Printers, Ltd. 312 Main Street, Box 700, Caldwell, Idaho 83605.

Cooperative League
Cooperative League. 59 East Van Buren Street, Chicago, Illinois 60605.

Crown
Crown Publishers. 419 Park Avenue, South, New York, New York 10016.

David McKay
David McKay Company, Inc. 750 Third Avenue, New York, New York 10016.

Doane Agricultural Service
Doane Agricultural Service, Inc. 8900 Manchester Road, St. Louis, Missouri 63144.

Doubleday
Doubleday & Company. 501 Franklin Avenue, Garden City, New York 11530.

Farm Quarterly
Farm Quarterly. 22 E. 12th Street, Cincinnati, Ohio 45210.

Fearon
Fearon Publishers. Educational Division. Lear Siegler, Inc., 6 Davis Drive, Belmont, California. 94002.

Freeman
Freeman Press. 660 Market Street, San Francisco, California 94104.

Future Farmers of America — FFA
National FFA Center. Alexandria, Virginia. 22309.

Goodheart-Willcox
Goodheart-Willcox Company. 18250 Harwood, Homewood, Illinois 60430.

Grosset & Dunlap
Grosset & Dunlap, Inc. 51 Madison Avenue, New York, New York 10010.

Harper & Row
Harper & Row Publishers. 10 East 53 Street, New York, New York 10022.

Heath
D. C. Heath & Company. College Department, 125 Spring Street, Lexington, Massachusetts 02173.

Hobar
Hobar Publications. 1305 Tiller Lane, St. Paul, Minnesota 55512.

Interstate
The Interstate Printers and Publishers, Inc. Jackson at Van Buren, Danville, Illinois 61832.

Iowa State University
Iowa State University Press. Press Building, Ames, Iowa 50010.

Irwin
Irwin Company. 1818 Ridge Road, Homewood, Illinois 60430.

Lea & Febiger
Lea & Febiger, Publishers. 600 Washington Square, Philadelphia, Penn. 19106.

Linde
Linde Division. Union Carbide Corporation. 270 Park Avenue, New York, New York 10017.

Lippincott
J. B. Lippincott Company. East Washington Square, Philadelphia, Penn. 19106.

Little, Brown
Little, Brown and Company, Publishers. 34 Beacon Street, Boston, Mass. 02106.

McGraw-Hill
McGraw-Hill Book Company. 5940 Touhy Avenue, Niles, Illinois 60648.

McKnight
McKnight and McKnight, Publishers. Bloomington, Illinois 61702.

Macmillan
Macmillan Company, Publishers. 866 Third Avenue, New York, New York 10022.

Meredith
Meredith Corporation. — Better Homes and Gardens. 1716 Locust Street, Des Moines, Iowa 50336.

Merrill
Charles E. Merrill Publishing Company. Division of Bell & Howell Company, 1300 Alum Creek Drive, Columbus, Ohio 43216.

Morrison
Morrison Publishing Company. 515 Woodlands Drive, Clinton, Iowa 52732.

National Farm Book Company
National Farm Book Company, Omro, Wisconsin 54963.

National Plant Food Institute
National Plant Food Institute. 1700 K. Street, Washington, D. C. 20006.

Ohio Vo-Ag Instructional Materials Service
Ohio Vocational Agriculture Instructional Materials Service. 2120 Fyffe Road, Columbus, Ohio 43210.

Pegasus
c/o Bobbs-Merrill Company., Inc. 4300 W. 62 Street, Indianapolis, Indiana 46268.

Prentice-Hall
Prentice-Hall Inc. Educational Book Division, Englewood Cliffs, New Jersey 07632.

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Ronald Press
Ronald Press Company. 15 East 26th Street, New York, New York 10016.

Sams
Howard W. Sams & Company. Subs. of ITT, 4300 62nd Street, Indianapolis, Indiana 46268.

Stipes
Stipes Publishing Company, Champaign, Illinois 61820.

Superintendent of Documents
Superintendent of Documents, Government Printing Office, Washington D. C. 20402.

Technical Publications
Technical Publications, Inc. 10114 Wyandotte Street, Kansas City, Missouri 64150.

University of Illinois
University of Illinois. 123 Mumford Hall, Urbana, Illinois 61801.

University of Wisconsin - Extension
University of Wisconsin - Extension. Agricultural Bulletin Room, 1535 Observatory Drive, Madison, Wisconsin 53706.

Vector
Vector Publications. 1945 Sharondale Avenue, St. Paul, Minnesota 55113.

Van Nostrand
D. Van Nostrand Company. 120 Alexander Street, Princeton, New Jersey 08540.

VEP
Vocational Education Productions. California State Polytechnic College, San Luis Obispo, California 93407.

Wadsworth
Wadsworth Publishing Company, Inc. Belmont, California 94002.

Watts
Franklin Watts, Inc. 834 Third Avenue, New York, New York 10022.

WAVAI
Wisconsin Association of Vocational Agriculture Instructors. Claire Rejahl, 2702 Monroe St., Madison, Wisconsin 53711.

Webb
Webb Book Publishing Company, 1999 Shepard Rd., St. Paul, Minnesota 55116.

Wiley & Sons
John Wiley & Sons., Inc. 605 Third Avenue, New York, New York 10016.

Windsor
Windsor Press. Box 280, Brightwaters, New York 11718.

Wisconsin Electric Cooperative
Wisconsin Electric Cooperative. 1810 South Park Street, Madison, Wisconsin 53713.

VISUAL AIDS

Bureau of Audio-Visual Instruction — BAVI
Bureau of Audio Visual Instruction, P. O. Box 2093, 1327 University Avenue, Madison, Wisconsin 53701.

Farm Film Foundation
Farm Film Foundation. 1425 H. Street, N. W., Washington, D. C. 20005.

Modern Talking Pictures
Modern Talking Picture Service. 1696 N. Astor Street, Milwaukee, Wisconsin 53202.

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